AMERICAN PRINTING HOUSE FOR THE
BLIND,
DEPT. OF EDUCATIONAL AND TECHNICAL
RESEARCH:
REPORT OF RESEARCH AND DEVELOPMENT
ACTIVITIES, FISCAL 1991

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Department of Educational and Technical Research

Report of Research and Development Activities

Fiscal 1991

American Printing House for the Blind
1839 Frankfort Avenue
Louisville, KY 40206

Mission

The American Printing House for the Blind promotes independence of blind persons by providing special media, tools, and materials needed for education and life.

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The American Printing House for the Blind (APH) has had an ongoing research program for 40 years. Initial impetus for APH to establish a research program was from the Committee on Research of the American Association of Instructors of the Blind in recognition of the need for an effective and stabilized attack on the research problems of the field. APH's Board of Trustees approved such a program at APH's Annual Meeting held in the fall of 1951. The following spring a Research Committee was convened. The purpose of the Committee was to investigate and recommend projects in the field of educational research to be undertaken by the staff. Marjorie Hooper was appointed to direct the initial work. Her first assignment was to attend regional conferences and visit schools for the blind to meet informally with classroom teachers to learn from them the problems which seemed most pressing and which appeared to require outside help for solution.

The resulting research program carried on at APH is unique in the field of education. Although the types of research activities undertaken are similar to some of those conducted at colleges and universities, there are a number of decided advantages in having the work done through the Printing House. For example, APH serves the nation as a primary source of educational materials for legally blind students. This means that communication channels are always open between APH's staff and the ultimate consumers of its products and services. Because of this, it is possible to identify specific areas of need. And, because of this, it is possible to use the ultimate consumers, both teachers and the students themselves, in the development and evaluation of needed tools and materials.

Other direct advantages in having a research program based at APH are (a) there is a tremendous amount of expertise both under the same roof and in the community which is always available for consultation, (b) because of APH's many faceted manufacturing capabilities, it is possible to produce and use a wide array of experimental materials, (c) in preparing materials for developmental projects, experimental materials can be developed in close collaboration with production personnel, thus assuring the models will be things that can be translated into products, and (d) successful results of research efforts are reflected in production. Thus, needed materials can be identified, developed, produced, distributed, and used by those students who need them.

Currently, overall priorities for APH's research program are influenced by the priorities set by the U.S. Department of Education's Office of Special Education and Rehabilitative Services, by Congressional Appropriations Committees, by sales of existing product lines, and by both APH's staff and its Educational Research and Development Committee in response to observed, general needs of the field. Primary areas currently being addressed include early childhood, multihandicapped, low vision, braille, educational measures, and microcomputer applications. Work being done in these areas, as well as some other activities, is briefly described in this report. In order that the reader have a general frame of reference for the work described, information is given for each project indicating its purpose, the project staff, its background, work done during APH's 1991 fiscal year, and work planned for the next year.

The spirit of APH's original research committee lives on in APH's research program. Its strength is in its interaction with the field. Many persons give of their time and expertise to cooperate with APH's research projects. Groups with particular expertise are convened to help identify specific needs in a given area and to work with research staff in developing specifications for needed new materials. Others tryout and evaluate experimental materials with the population for whom the material is intended. The sections of this report listing agencies that have participated in APH's research program and individuals who have served as consultants on the various projects give indication of the ongoing and invaluable input received from the field. Only through the outstanding cooperation of persons working in the field has APH's research program been able to thrive and to help teachers solve some of their most pressing problems by providing needed information and developing special materials designed to meet the unique needs of the students they serve.

Early Childhood

On the Way to Literacy: Early Experiences for Young Visually Impaired Children (formerly entitled Developing Literacy: Basic Skills, Concepts, and Early Experience (continuing)

Purpose: To provide a program and materials for teachers and parents of young visually impaired children to assist them in providing, from birth, the experiences and interaction necessary to develop and interrelate skills for literacy

Project staff: Suzette Wright, Project Director and Coauthor
Josephine Stratton, Project Coauthor
Tom Poppe, Model and Pattern Maker

Background. Literacy is often narrowly defined as the ability to read and write. In a broader sense, however, literacy refers to a person's ability to speak, listen, read, and write--to get meaning from and bring meaning to written and spoken words (Stratton & Wright, 1991). Defined in this way, the development of literacy can be seen as the interaction of many skills which begin to develop from birth. According to the literature, the components of literacy include:

1. the development of motor skills which enable the young child to explore and accumulate the experiences necessary for building concepts (Cratty, 1967; Lockman, 1986);

2. the formation of concepts concerning the world and the child's experience of it (Flavell, 1985; Ginsberg & Opper, 1979);

3. the growth of language skills which make communication of concepts and ideas possible (International Reading Association, 1986; Wishon, Brazee, & Eller, 1986);

4. listening to stories from an early age (Granucci, 1986; Morrow, 1983; Teale, 1984; Trelease, 1982)--thus establishing a desire to read (Kontos, 1986; Trelease, 1982) and an awareness of the use of symbols (Beardsley & Marecek-Zeman, 1987; Dyson, 1984; Granucci, 1986; Kontos, 1986).

Literacy is a process much like learning to walk or talk--involving the development and interaction of skills over a long period of time which result in the ability to read, write, listen, and speak with understanding.

For the blind or visually impaired child, literacy is the same gradual process, and emerges from experiences that are meaningful to him. He needs the same opportunities for experiences as all children do. For some visually impaired children, however, the emphasis or the way of learning may be somewhat different.

The product resulting from this project will provide, in a print document, the framework for the development of literacy from birth and will suggest activities which may assist a visually impaired infant or child.

Also included will be storybooks, containing tactile and visual graphics appropriate for a young blind or low vision child along with braille and print text. Suitable commercially available products will be recommended.

Work during FY 1991. Data returned from four evaluation sites were posted and analyzed. Eight teachers and 14 parents evaluated the handbook and regularly read-aloud the tactile/visual storybooks with 27 visually impaired preschoolers over an 8- to 10-week period. Evaluators were almost unanimously pleased with the organization, overall tone, and reading level of the handbook. Their evaluation of the handbook indicated several areas where additional information was desired--extension of language and dressing skills as they relate to hand skills. No major changes were suggested and all expressed overall satisfaction with the handbook. Many positive comments were made by the teachers:

> "Being a speech therapist, I was very pleased with the first section and I couldn't wait for my parents in our infant stimulation class to read it." (Infant-Communication)

> "I think this is excellent due to the inclusion of many specific examples of finger and hand activities . . . should be especially helpful to parents . . . " (Toddler-Tactual Exploration)

Parents comments about the handbook included the following: "easy to understand," "reassuring," "interesting new information," "very positive--goes a long way for a scared parent."

The tactile/visual storybooks received the approval of evaluating teachers. The level of interest and progression of tactile graphics from real objects and thermoformed objects to raised line drawings was approved. Teachers liked this "progression, overall variety . . . and the decreasing prominence from 3-dimensional to 2-dimensional." This seemed a "natural sequence, increasing the challenge to the child, and making the story/text more and more the focus." Changes to the raised line drawings in one book were suggested by an evaluator to more clearly show spatial relationships and the orientation of objects. No other major changes were recommended. Asked to assess students' interest in the storybooks, information returned by teachers indicated highest interest in thermoformed and real object storybooks--particularly for younger students and potential braille readers. In answering why a particular storybook would appeal to a preschooler, comments included

> "It's about things the child can understand."
> "The rhythm, fun words, and repetition made the story enjoyable."
> "Concepts introduced are very appropriate for this age group."

Teachers agreed there was a need for additional storybooks like the tactile/visual storybooks they had evaluated.

Following analysis of the evaluation data, revisions to the parent/teacher handbook were completed. The handbook, renamed On the Way to Literacy: Early Experiences for Visually Impaired Children, was edited by research staff. Layout and design were planned by project staff. Text was formatted accordingly and prepared as camera-ready copy. Approximately 50 line drawings were finished by project staff for inclusion in the document. Final revisions were made to each of the 10 Tactile/Visual Storybooks which are a part of the On the Way to Literacy materials. A more durable plastic was located to replace the brailon plastic used in two storybooks. Samples of several types of clear plastic were tested as a possible replacement for the PETG plastic used in the thermoformed storybooks in order to reduce cost. Final thermoform molds, braille plates, camera-ready art, and camera-ready printed text for all 10 storybooks were completed.

A production document detailing specifications for the handbook and storybooks was completed on January 9th. A final report of all project activities has been completed. Also during this fiscal year, the project's basis in theory and resulting materials were presented at the International Conference of the Association for Education and Rehabilitation of the Blind and Visually Impaired held in Washington, D.C. The presentation was well-attended and practitioners expressed much interest in the Tactile/Visual Storybooks. An article concerning the project was submitted to RE:view and was published in the summer 1991 issue.

Work planned for FY 1992. Project staff will assist production staff in producing the first run of the handbook and tactile/visual storybooks.

Supplement to On the Way to Literacy: Early Experiences for Young Visually Impaired Children (new)

Purpose: To provide additional tactile/visual storybooks for young visually impaired preschoolers using formats developed in the previous project, On the Way to Literacy

Project staff: Suzette Wright, Project Director
Tom Poppe, Model and Pattern Maker

Background. During the evaluation of the On the Way to Literacy materials, evaluators requested that additional tactile/visual storybooks be developed, particularly storybooks featuring real objects and thermoformed replicas of real objects. Students were assessed as being most interested in the real object and thermoformed storybooks, although each book was mentioned by one or more students as his/her favorite. The range of types of tactile graphics used in the storybooks was approved.

In March 1991, the desire for additional read-aloud books featuring braille and print and tactile/visual illustrations was repeated by members of the Braille Needs Assessment Committee. More storybooks featuring thermoforms of real objects and books corresponding to those used by young sighted children were requested by the group, who prioritized this as the first need under the area of materials to be developed. (Overall, materials development was prioritized as the third of four areas of need, following assessment and organizational skills.)

To address the need for additional tactile/visual storybooks for young visually impaired children, a second project of more limited scope was initiated in June of 1991. Four to six books designed to be read to a child by an adult reader will be created, or project staff will design adaptations of commercially available children's books.

Like the first set of tactile/visual storybooks, additional books will display braille and print text, providing exposure to the written word for both blind and low vision children and an appropriate medium for the adult reader, whether blind or sighted. Tactile and visual illustrations will be created to enhance the meaning and appeal of the books. Tactile graphics will be designed according to criteria established for the first set of tactile/visual storybooks; these criteria were based on tactile graphic research contained in the literature.

Work during FY 1991. Work on the project, itself, was begun in June of 1991, following approval of the project proposal. An examination of recently published children's books and classics for young children was begun in August.

Review of existing children's books has revealed some stories suitable for translation. In these cases, the story's text will be preserved and published in braille and print along with tactile graphics designed by project staff. Such translated books would be completely produced at the American Printing House for the Blind and probably would not involve use of the commercial book.

In addition, work on several original storybooks was begun by project staff. Information concerning contracts with free-lance writers was obtained and a list of possible writers was made.

Work planned for FY 1992. A meeting with Josephine Stratton is scheduled. She will serve as the project's major consultant. Approximately 12 storybooks will be proposed for development. A combination of recently published children's books, classics for young children, and original storybooks will be chosen. Tactile graphics for each storybook will be designed and sketched. The storybooks and accompanying sketches will be submitted to three consultants, who will advise project staff as to which are most promising. Six storybooks will be chosen for further development. Prototypes of these six will be made and evaluated by teachers and parents with visually impaired children from 2 years of age up to kindergarten level.

Infant Skills Project (continuing)

Purpose: To develop a collection of tangible child-use materials targeted for infants and toddlers, birth-24 months, and to develop accompanying written material useful by parents and teachers in developing critical skills in young children

Project staff:
Sheri Moore, Project Director
Karen Poppe, Project Assistant
Tobey Burton, Project Assistant

Background. The most recent Early Childhood Materials Needs Assessment meeting developed recommendations for specific early childhood educational materials research and development projects. The committee delineated and set priorities in several areas, with the Infant Skills project receiving a high priority rating. This high priority correlates with the emphasis at the federal level to initiate and strengthen infant/toddler programs throughout the United States under PL 99-457 and extended under PL 101-476.

Work during FY 1991. Several ongoing project activities continued and expanded. Staff continued to source and keep abreast of relevant literature to the Infant Skills Project. Literature surveys included areas such as child development, special education for young children, pediatric medicine, pediatric ophthalmology, family structure and development, service delivery options, physical therapy, occupational therapy, and exemplary educational programs and services. In addition, the agencies/services program databases, to be utilized in this project, were expanded and updated. The data from a teacher survey, querying teachers of infant visually impaired and blind children as to useful and needed educational materials as well as helpful resources and references, were utilized. These data served as an important basis for the collection of both APH developed educational materials and commercially available items that facilitate the development of critical skills in young visually impaired children. Specifications were developed and refined for the APH designed and developed materials to be included in the Infant Skills Kit.

Significant time was spent in reviewing materials, both commercially available and those developed by APH that would be useful in developing critical skills with young children whose vision is impaired. Over 100 materials were reviewed and evaluated for their applicability for the Infant Skills Kit. Of these initial 100 items, 50 were selected for the formative, evaluation. Project staff visited three programs serving some 150 infant/toddlers blind and visually impaired children and evaluated the materials in each program. APH personnel met with program staff who evaluated each of the 50 materials on a three-point scale. Program staff specialists included vision specialists, early childhood specialists, occupational therapists, physical therapists, and program directors. Program staff discussed their ratings with APH staff; in several cases, they kept the materials for an extended period of time to form more accurate impressions of the usefulness of the materials. After receiving all ratings, project staff posted the data and analyzed the results.

Subsequently, APH staff sourced the distributor or manufacturer of each item receiving a combined rating of 3, attempting to learn if the item will be available for some time. Project staff collected sets of materials for a comprehensive field evaluation.

Along with the tangible materials in the Infant Skills Kit, additional support materials will be included in the form of an activities manual for teachers. A second resource/support guide, the Parent Early Childhood Education Series developed by the early childhood staff of the Overbrook School for the Blind, will also be included. This series, described more comprehensively in a separate project report, entitled "Parent Early Childhood Education Series," was evaluated extensively by a number of experts in the area of early childhood vision. This series will also be offered for separate sale, without the accompanying Infant Skills materials.

Work planned for FY 1992. A comprehensive field evaluation of the Infant Skills materials and accompanying activities will be conducted after sourcing, obtaining, and collating multiple sets of all materials. Field evaluation sites will be contacted, and permission to participate will be obtained. An evaluation component will be designed; appropriate evaluation instruments, data collection forms, and questionnaires will be developed. Throughout the evaluation, staff will keep in contact with and monitor field evaluation sites. Field evaluation data will be posted and checked. An analysis will be made of these data, and revisions to the tangible materials as well as to the accompanying activities, will be determined. Staff will implement all revisions. Following final testing and any necessary revisions, all materials will be readied for introduction into the production pipeline. Production documents will be prepared and project staff will meet on a regular basis with production personnel. Project personnel will submit all tangible materials to U.S. Testing Company for safety evaluation. A final report will be written, detailing all aspects of project development.

Parent Early Childhood Education Series (continuing)

Purpose: To evaluate and revise a set of written materials useful in developing critical skills in young visually impaired children, targeted for parents and teachers

Project staff:
Sheri Moore, Project Director
Bernadette Kappen, Project Author and Codirector
Karen Poppe, Project Assistant

Background. There is a documented need for specific training materials for parents and teachers of young blind and visually impaired children. Too often, parents are overwhelmed by a long booklet or book covering an array of topics. Experienced teachers of infant and preschool blind children developed the Parent Early Childhood Education series to provide concrete and discrete information in a variety of topical areas. These topical areas selected include those proven to be important to parents and experienced teachers working with young children with visual disabilities.

Work during FY 1991. The Parent Early Childhood Education Series is a set of written materials detailing suggestions, recommendations, and activities for working with visually impaired young children. This guide, developed as the Parent Early Childhood Education Series by Overbrook School for the Blind's early childhood staff, contains a great deal of excellent information. A wide array of relevant subjects are addressed in this series, including topics such as:

General suggestions for infants with visual impairments
General suggestions for the multiply impaired young child
Terminology--words relating to vision impairment
Developing eating skills, including general suggestions, spoonfeeding, cup drinking
Promoting orientation and mobility skills
Tactile stimulation activities
Sensory development activities
Developing vision skills
Selecting equipment and toys
Developing refine motor skills
Positioning and movement
Cognitive development
Siblings and suggestions for family life
Developing listening skills
Parent-child interactions
Developing language and communication
Developing social skills
Early parent-child interaction
Socialization
Stereotypic mannerisms--prevention and extinction

The Overbrook materials were reviewed and evaluated by APH staff as well as a group of external expert reviewers. A comprehensive evaluation form was developed to structure the response of the expert field reviewers. A great deal of data were generated by the expert reviewers in general areas such as general impressions of the usefulness of these materials; the population(s) of children/parents/professionals for whom these materials will be most appropriate; ways in which these materials could be improved; the usefulness and quality of the print and the graphics; topical/content areas to delete; content areas to be added; format and packaging possibilities for these materials; Are these materials appropriate for families with multicultural considerations?; and so on.

Content reviewers were also asked to individually evaluate each page of the Parent Early Childhood Education Series. Reviewers were requested to "grade" each page and write comments regarding specific suggestions for that page directly onto the copy. When all content/expert reviewers had completed their reviews, all data were posted, checked, and reviewed. Subsequently, all data were analyzed and a list of suggested changes to the materials was developed. Project staff then met with the Overbrook Project Codirector, and reviewed all recommendations for additions, changes, and deletions. Each suggestion was reviewed and considered; a final listing of all revisions was generated. A timetable was discussed for the completion of all revisions.

Project staff have coordinated all revisions of the Parent Early Childhood Education Series with the Overbrook Codirector. Overbrook staff have been involved in all phases of revising the materials. The Parent Early Childhood Education Series will be included as a component of the Infant Skills Kit as well as being made available for separate sale. All project materials have received a final review and editing from APH project staff. Overbrook staff are also involved in the final editing process.

Work planned for FY 1992. Project staff, both at APH and Overbrook, are in the final phases of review and revision. Each revision phase is being made via a desktop publishing process to result in a reasonably priced product to consumers. A number of illustrations are being modified or redrawn, so that all graphics "fit" into one style. Following all final revisions and editing, a production document will be developed prior to initiation into the production pipeline.

Preschool Learning Activities (continuing)

Purpose: To develop an instructional manual of functional/practical learning activities, appropriate for blind and visually impaired preschoolers, ages 3-, 4-, and 5-years old

Project staff: Sheri Moore, Project Director
Karen Poppe, Project Assistant
Tobey Burton, Project Assistant
Tom Poppe, Model and Pattern Maker

Background. APH has initiated the development of a continuum of educational materials for the 3-, 4-, 5-, and 6-year old age group. This is particularly timely, with many additional preschoolers being served through PL 99-457 and its extension PL 101-476. This specific project involves a manual of functional, varied, and numerous learning activities, specifically designed to make use of common objects in the development of a continuum of sensory skills and important concepts. Activities are designed to address skills that often require a great deal of practice, such as squeezing, pouring, sorting, categorizing, classifying, sequencing, and so on. The activities make use of environmental materials such as sponges, buttons, nuts, rocks, pennies, silverware, basters, water, marbles, magnets, beads, golf tees, cotton balls, and clothespins. Special consideration is given in the manual to learning experiences beneficial to young visually impaired children. In addition, all learning activities are also designed to foster integration experiences with sighted peers. To facilitate these experiences, a strong visual adaptations section is included with each activity.

Work during FY 1991. The Preschool Learning Activities manual title, which varies from the project title, is Hands On: Functional Activities for Teaching Basic Skills and Concepts to Visually Disabled Preschoolers. This extensive manual, numbering some 165 pages, is organized for providing ready access to a wide array of appropriate activities for visually impaired and blind preschool level children. Major components of the manual include: Introduction; Activity Section, including subsections of preliminary activities, dry transfer, wet transfer, stringing, folding, clipping, twisting, sorting, care of person, care of the environment, food preparation, work bench activities, art, and grace and courtesy; Ideas for parents/home activities; and Appendixes of hard-to-find items, suggestions for further reading, and references/resources. A series of molded ABS plastic trays have been specifically designed to facilitate the various activities included in the manual. The Hands On activity manual was formatively evaluated by eight local teachers or parents, familiar with programming for young blind and visually impaired children; results of this formative evaluation were integrated into a revised manual.

Following the formative evaluation revisions, an extensive field evaluation was conducted. The evaluation involved evaluating all of the 55 activities and the corresponding extensions designed to correspond with each activity. The format evaluated is summarized as follows:

Materials - The necessary items.
Earlier Work - Any activities that the child should have done first.
Procedure - A description of how to show the work to the child.
Points of Interest - Anything that may capture the child's attention.
Variations - Activities that are variations on the theme.
Extensions - Activities using one or more of the materials in a completely different way.
Language - Vocabulary building.
Math - Counting or adding.
Science - Using the material to help understand the natural world.
Geography - Use of the material in learning about other countries or about water or land.
Sensorial - Using any of the five senses.
Art - Using the materials creatively.
Music - Songs related to the activity or materials used in the activity.
Books - Books related to the activity or the objects used in the activity.
Games - Informal activities to promote socialization.
Drama - Pretend play related to the activity.
Problem Solving - Used to further the child's concept of the materials by asking questions requiring flexible thinking, or it is used as an extension for using the materials in a more open-ended way.

The Hands On materials were evaluated in 10 programs for preschool visually impaired children. As teacher evaluations were received, staff recorded and reviewed all comments and recommendations. When all reviews were received, the data were posted, analyzed, and checked for accuracy. These data were used to determine revisions made to the manual of activities as well as to the trays used to facilitate activities. Following the completion of all revisions, the manual and trays underwent three final expert reviews, from preschool vision experts who have had no input into the project development or evaluation process. Additional revisions were identified through this process. Project staff made final revisions.

Work planned for FY 1992. All revisions will be incorporated into a computer disk in preparation for desktop publishing. Following final revisions, project staff will prepare a production document to facilitate production of the Hands On materials. Project staff will work with production staff on producing a high quality manual and trays. U.S. Testing Company will evaluate the trays. In addition, project staff will write a final report detailing all aspects of project development.

Early Childhood Microcomputer Applications (continuing)

Purposes: To familiarize staff with computer software designed for young children, to assess its applicability and/or adaptability for young blind and visually impaired children, and to consider development of a talking software program for young blind children

Project staff: Sheri Moore, Project Director
Debbie Willis, Project Codirector
Venus Elder, Project Assistant
Microcomputer Group

Background. The increasing trend of working with young children and computers was discussed at the Fifth and Sixth Microcomputer Advisory Committee meetings. Specific to young blind children, it was determined that obtaining computer literacy early was a decided and necessary advantage. The advisory group recommended that APH staff should explore the use of computers with young totally blind children and, secondly, develop a beginning concept orientation talking software program for this specific audience.

Work during FY 1991. APH staff continued to attempt to keep abreast of the increased trends in microcomputer use with young children. Resource material and literature related to this specific topic were sourced and collected. Several pieces of early childhood software with possible application for young visually impaired children were reviewed. Also, specialists in early childhood vision, with microcomputer experience, regularly participate in the Microcomputer Advisory Committee meetings.

As a result of the deliberations at the Seventh and Eighth Microcomputer Advisory Committee meetings, work on developing a talking software program for young blind children was postponed. The Committee discussed an array of projects related to the needs of blind students and microcomputer access, and determined that there were other areas of more pressing need for APH to expend its fiscal and staff resources. More specifically, a project to develop software with a high interest/low vocabulary emphasis received priority.

Consistent with the committee's interest in having APH staff continue to monitor and keep abreast of developments and trends in microcomputer use with young children, a number of site visits were made to local educational programs using microcomputers with young children, and APH staff attended local workshop highlighting the adaptive Firmware Card. A number of microcomputer programs were specifically targeted for review and observation, including the IBM Writing to Read series. Along with Writing to Read, the companion programs of Get Set (preschool level) and the new TLC program (2nd to 6th grade) were observed. The TLC program, produced by IBM, stands for teaching, learning, and computing.

Work planned for FY 1992. Printing House staff will continue to monitor developments and trends related to the use of microcomputers and young blind and visually impaired children. Several staff members collaborate in this specific area and share information among themselves and teachers from the field seeking information from APH.

The specific software project in early childhood is presently "on hold" as recommended by the Microcomputer Advisory Committee.

Early Childhood References and Resources and Low Vision References and Resources (continuing)

Purpose: To research recent literature relevant to young blind and visually impaired children and to develop a resource list of such references; to research recent literature relevant to working with low vision individuals and to develop a resource list of such references

Project staff: Sheri Moore, Project Director
Karen Poppe, Project Assistant

Background. A selected bibliography of recent early childhood vision literature was prepared for the Printing House's 1987 Annual Meeting of ex officio trustees. At the same time, several other early childhood special education resource listings were also compiled and distributed including: professional journals, curricula, general references, and assessment tools. These resource materials have continued to generate considerable interest and requests from vision professionals.

Work during FY 1991. Because of the continuing demand for these resource and reference materials, the selected bibliography of early childhood literature, specific to blind and visually impaired children, has been refined and updated annually. The updated bibliography contains nearly 175 references, most being written in the past 7-8 years. The revisions have been annually made prior to annual meeting, with copies available at no charge upon request.

In addition, a second bibliography was researched and developed entitled Developing Visual Efficiency. This selected bibliography contains some 200 references relevant to the important topic of developing visual efficiency in low vision learners. These materials continue to be available as a service, upon request, to Printing House consumers. Staff have received a number of letters and phone calls commenting on the usefulness of these reference and resource lists. One state reported that it has sent copies to all vision professionals working in the state.

Work planned for FY 1992. Project staff will continue updating both reference/resource lists on an annual basis. As before, both lists will be available upon request at no charge via mail or phone.

Parents and Visually Impaired Infants (PAVII) (continuing)

Purpose: To provide resource and reference materials useful in developing individualized intervention programs for infants and young children with visual impairments, target age birth through 2 years

Project staff: Sheri Moore, Project Director, APH
Deborah Chen, PAVII Author
Fred Otto, Editor
Karen Poppe, Project Assistant and Editor
Gail Cavello, PAVII Author
Clare Taylor Friedman, PAVII Author

Background. The PAVII materials were developed through a federally funded project administered through Blind Babies Foundation in San Francisco, California. Materials developed through the 3-year project are targeted for parents, early interventionists, and special educators providing home-based services to families with visually impaired infants. There are six print booklets comprising project materials, each with several sections as follows:

1. The Parent Assessment of Needs (PAN). An ecological inventory or interview/report form which helps parents to identify home-based goals and prioritize objectives for their infants.
2. The Parent Observation Protocol (POP). An instrument for using a video "microteaching" format in parent-training. The format encourages parent observation of self and child, as well as identifies teaching priorities and strategies for facilitating early learning experiences.
3. PAVII "How-To" Papers on Assessment. This is a series of papers for home-based assessment of infants and toddlers who are visually impaired.
4. The Art of Home Visiting. A paper which discusses roles/responsibilities and prerequisite competencies for a home visitor. It also offers practical suggestions for a home visit and issues encountered in the home visit process.
5. Getting Ready for School. A paper for parents considering preschool programs for children with visual impairments. The paper discusses the learning environment, family factors, child factors, school district factors, expert input, and educational rights.
6. Learning Together: A Socially-based Curriculum for Infants and Toddlers with Visual Impairments is a parent guide of home-based strategies for daily routines which integrate cognitive, social, communication, motor, and perceptual skills. The guide includes a brief discussion about the parent's role as "teacher," the home as a primary learning environment, and suggestions for typical routines such as meal time, bath time, bedtime, play time, and going out.

Work during FY 1991. Printing House staff and a desktop publishing consultant have completely reformatted all PAVII materials. The process, although initially time consuming, will simplify future modifications and revisions. The desktop publishing process has enabled APH to price the PAVII materials very reasonably. APH staff have worked collaboratively with the desktop publishing specialist to ensure a quality product. The editing process was also performed by APH staff. Printing House research staff worked closely with APH production personnel throughout the production phase.

Work planned for FY 1992. Several activities remain before completion of the PAVII project. APH staff will write a comprehensive report of the development of the Parents and Visually Impaired Infants materials. Project staff will also likely conduct several workshops on the use and application of these new products. APH staff will also continue longterm monitoring of the PAVII materials content, and upgrade, improve, and revise as necessary. The revised activities will be done in collaboration with PAVII authors. Project staff plan to continue to have a close, collaborative relationship with the PAVII authors.

Classroom Calendar Project (completed except for final report)

Purpose: To develop a classroom calendar with both print and braille particularly for use with preschool and primary level visually impaired children

Project staff: Eleanor Pester, Project Director
Karen Poppe, Project Assistant
Tom Poppe, Model and Pattern Maker

Background. During visits to both preschool and primary classrooms for the visually impaired in May of 1988, both calendars and activities centered around them were observed. The calendar seemed to have the potential for being a useful educational tool, but required adaptation to be meaningful for both large type and braille readers. Some busy teachers did not take the time to adapt a calendar, and some of the calendars which teachers had adapted were rather unattractive. The solution seemed to be to develop a large type/braille calendar for classroom use.

A market search was conducted to see calendars available for regular classroom use, and several sample calendars were obtained. Possible methods and materials for making the calendar were explored and a list of possible symbols was compiled. A prototype was developed and a planning document and time line were written.

The project was presented to an in-house committee and discussed. Following the in-house committee meeting, questionnaires were developed and sent to nine reviewers. When all nine questionnaires were returned, data were analyzed, and objectives and suggested activities were compiled.

Based on this information, recommendations were made for the production of (1) a classroom calendar with moveable braille/large print labels and attractive visually/tactually distinguishable symbols for holidays, etc., (2) individual monthly calendars with large type/braille number stickers, and (3) the present APH braille calendar with minor revisions. A report was written and distributed to the in-house committee for comment before proceeding.

Next prototypes of both the classroom calendar and the individual calendar were prepared and placed at 10 sites for hands-on evaluation.

Work during FY 1991. Data from the evaluations were analyzed and only minor revisions which could be made for production without further formal field testing were indicated. Specifications were written for the production of all three calendars. Specific changes were made in the 1991 APH Braille Calendar to make it more useful for children in the primary grades and beyond. It was also advertised in the latest instructional aids catalog which resulted in increased sales. The Classroom Calendar Kit and the Individual Calendar Kit were turned over to production and are expected to be available by 1992.

Work planned for FY 1992. A final report will be written.

Multihandicapped

Making Picture Recipes (new)

Purpose: To evaluate a manual demonstrating how to make and implement a picture recipe system with nonreading multihandicapped low vision students

Project staff: Sheri Moore, Project Director
Tobey Burton, Project Codirector
Mary Zatta, Project Author
Diane Furino-Bleier, Project Author

Background. The purpose of the Picture Recipe program is to provide a means of developing cooking independence for the low language students who are non or beginning readers. This curriculum originated from needs within The Perkins School for the Blind. Teachers found that as the students became adolescents, daily living skill instruction and preparation for future placements into community living warranted the presentation of cooking instruction. There was no formal curriculum developed to address the needs of adolescent students who were non and/or beginning readers. It was this situation which prompted the development of this picture recipe cooking program.

In evaluating other materials, many of the commercial materials researched were found to be inadequate. In some materials, pictures were too small for visually impaired students/clients. In other materials, the presentations were visually confusing or too complex for students/clients with perceptual and/or learning problems. Another drawback to using commercial picture recipes was the the amounts listed were not easily adapted. Through trial and error with various techniques, a method was developed that could easily be used in a variety of educational and residential settings and could accommodate various sized groups.

The program includes a manual with easy, how-to directions; sample recipes formatted in two different ways; corresponding checklists for assessment; and helpful hints for adaptations. Also included is a master set of reproducible picture cards with which to make recipes. The master set of picture cards is organized in the following categories: food items, utensils, processes, appliances, miscellaneous.

Work planned for FY 1992. APH staff will review and refine the materials along with the authors, prior to a content evaluation by several expert reviewers. Project staff will develop an evaluation system that facilitates the evaluation of the Making Picture Recipe program. The results of the evaluation will determine future project directions.

Multihandicapped Adolescent Project (continuing)

Purposes: To develop a manual of functional and community-based learning activities designed to meet the needs of adolescent multihandicapped visually impaired students, and to develop and evaluate several tangible materials useful in fostering independent functioning in adolescent multihandicapped students

Project staff:
Sheri Moore, Project Director
Martha Majors, Project Codirector
Mary Zatta, Project Codirector

Background. The Multihandicapped Adolescent Project is targeted for students who have achieved basic skill levels and are involved in an educational program emphasizing self-care, independence, and life/community living skills. Written activities include functional and age-appropriate applications, stressing skills useful in a community-based setting. Applications of functional academics are also incorporated into project activities.

Work during FY 1991. Project staff continued to keep abreast of literature and educational materials in the area of functional and community-based instruction. Project materials were formatively evaluated. Numerous and significant additional activities have been written for the project. The majority of these activities have been formulated and designed by experienced teachers of multihandicapped, visually impaired adolescent level students. Activities cover a wide array of practical, functional program areas, and stress the importance of developing independence, self-sufficiency, functional skills, and community living/life skills. The format for the presentation of the activities has been redesigned, with the objective of presenting information in a more concise and useful format. The revised format includes an overall rationale for using a functional curriculum, with an emphasis on practical activities that help students to generalize information. A main curricular area, such as community experience, is detailed, along with subtopics and specific activity suggestions. For each of these subtopical areas, further activity suggestions are given in areas such as functional reading and math; manipulative experiences; group/socialization applications; language/communication; sensory experiences; and extensions in areas such as cooking, art, music, dramatic play, etc.

Work continued on refining activities and adding additional teaching suggestions to the program. The project director worked in cooperation with several teachers of multihandicapped visually impaired students and teachers of Deaf-Blind students at Perkins School for the Blind. These teachers have formatively evaluated and reviewed the project materials, used the suggested activities in their classrooms, and have developed additional "teacher tested" activities for inclusion in the Multihandicapped Adolescent Project materials. The project director continued to work closely with Martha Majors and Mary Zatta, who are coordinating the contributions of the Perkins staff.

Work planned for FY 1992. Following refinement of the activities by the project authors, the complete set of materials comprising the Multihandicapped Adolescent Project will be field evaluated. Staff will work to make contacts with appropriate programs, and will secure any needed permissions to participate. Typically, staff will contact both program supervisors as well as classroom teachers who will be evaluating the materials on a daily basis. Project personnel will also construct an evaluation that will comprehensively address all aspects of the materials to be tested with the Multihandicapped Adolescent Project. Data from the evaluation will be posted, analyzed, and revisions will be determined. Preparations will then be made for the writing of a production document for use with the first production run of these materials. Staff will continue to monitor the project through the production phases, and will also complete a final project report.

Pragmatic Classroom Units for Young Multihandicapped Children (new)

Purpose: To evaluate a curriculum model, presented in a variety of classroom units format, that assists teachers of young multihandicapped visually impaired children in developing a methodology and practical approach to teaching, with a particular emphasis on the development of communication

Project staff: Sheri Moore, Project Director
Wendy Drezek, Project Author and Codirector

Background. The Pragmatic Classroom Units were developed by Dr. Wendy Drezek to accompany a curriculum model based on the work of Ellyn Lucas-Arwood. Pragmatism is a methodology for facilitating communication for children with language disorders. In this model, language has a social and cognitive base, and is shaped by consequences in the environment; language is only successful insofar as it results in the intended change in the environment. In the classroom, routines are used to structure a common meaning, units are used to introduce new concepts and vocabulary, and "boobytrapping" is used to force the need to communicate. Sing language and other nonvocal techniques are used with nonvocal and echolalic students.

The units can be used in several ways. They provide content and extension activities for individual lessons. The pages can be reproduced and sent home to parents to structure home carry-over. The skills/concepts/vocabulary portion can be used to monitor progress and achievement. Skills, concepts and vocabulary appear in multiple units. The initial appearance of the skills, concepts, and vocabulary are usually at a very concrete level (example: orange pumpkin) with a later occurrence at a more abstract level (example: sort colors). The purpose of the units is to present skills/concepts/vocabulary in a rich context of real objects and actions, rather than as isolated splinter skills.

Lists of units include: school, me, leaves, mask, hat, bag, candy, pumpkin, corn, potato, apple, cranberry, turkey, cookie, present, tree, fruit, vegetable, bread, drinks, snacks, dessert, shape, valentine, spring, egg, animals, bathroom, kitchen, tools/household objects, music, toys, art, books, texture/touch, size/measure, space/time, color/shape, letters, numbers, community helpers/vehicles, community activities, summer, weather, dinosaurs, dragons and monsters, stories.

Work during FY 1991. Materials were studied and received by APH staff. Information and data were gathered from the author related to the evaluation of the Pragmatic Classroom Unit materials in several sites in Texas. In addition, data were gathered regarding the use of the classroom unit materials in several workshop/training sessions in Texas. Project staff worked closely with the author to ready the materials prior to their expert review. Project staff also developed an evaluation form for use by the expert reviewers to critique the Pragmatic Classroom Unit materials.

Work planned for FY 1992. The classroom unit materials will be evaluated by a group of expert reviewers and content materials. APH staff will make necessary contacts and monitor the review process. Project staff will develop an appropriate evaluation system and accompanying forms. All data will be posted, checked, and analyzed. Based on the expert reviewers' data, a decision will be made about the need for additional evaluation and/or publication of these materials.

Task Oriented Inventory and Work Skills Program (formerly entitled Effective Use of Objects: A Process Centered Intervention) (completed)

Purpose: To provide a program that will assess and include work skills activities for a process approach toward task oriented behavior with objects

Project staff: Bill Duckworth, Project Director
Fred Otto, Project Assistant
Suzette Wright, Project Assistant
Gretchen Stone, Project Author

Background. The Austin Work Skills Evaluation, from the Texas School for the Blind, was found to offer a great deal of excellent material for programming with young visually impaired students with developmental delays as well as the moderately to severely multihandicapped student. In working with the author, however, it was found that many of the ideas could be expanded and the program could include information for various populations of visually impaired students. The program developed to be more nearly a process of concept development for the limited student or the student with limited experiences than it was a program that led directly to vocational training. With the wide range of the population needing prevocational training, it is natural that various professionals within this range were critical of doing a program for any one group of this population. This criticism was beneficial as it gave the project staff and the author other aspects to consider in revising the material. The program remains, however, a process of handling materials in a way leading to task-oriented behavior and the development of work-related concepts which will serve as a basis for more specific training.

Work during FY 1991. In FY 1990, a major redesign of the format of the materials was made plus inclusion of refinements and explanations of many of the concepts. An experimental edition was distributed for field evaluation to nine sites in March 1990. Pending final revisions, the program was approved for production in June 1990. In FY 1991, a final edition of this program was developed using information from the field evaluation. The edition is made up of two volumes which include an inventory at two levels of ability with a programming guide at the lowest level. The first volume deals with the exploration of physical properties of objects and the second volume stresses task application and productivity. The program was published on January 30, 1991.

Low Vision

Assessment Program and Intervention Guidelines for Visually Impaired Children (new)

Purpose: To evaluate the University of California Berkeley (U.C. Berkeley) Assessment Scales for Visually Impaired Children, and to determine their applicability for use with teachers of young visually impaired children

Project staff: Sheri Moore, Project Director
Amanda Hall, Project Author and Codirector
Linda Kekelis, Project Author

Background. The U.C. Berkeley Assessment Scales for Visually Impaired Children were developed under a grant from the California State Department of Education. The overall goal of this project was to refine the scales through pilot-testing with a small number of blind and low vision children in the San Francisco Bay Area. The scales examine developmental milestones of particular importance to children with vision loss between birth and 2 years of age and address the following domains:

social/emotional development
language development
cognitive development
gross motor development
functional vision
home environment

For this project, (a) the scales were pilot-tested with 12 infants on the register of the Variety Club Blind Babies Foundation, (b) test items were refined for each of the scales, (c), a record-keeping system was developed for the scales, (d) preliminary developmental data for visually impaired infants between birth and 2 years were collected, and (e) inter-rater reliability for scoring of the scales was determined.

Work planned for FY 1992. The Assessment Scales for Visually Impaired Children, along with the accompanying guidelines component, were reviewed by APH project staff. The program and guidelines also will be reviewed by several expert reviewers. Printing House staff will develop an evaluation plan and will make all necessary arrangements to implement the plan. Data will be posted, checked, and analyzed to determine future project directions. All activities will be coordinated with the two project authors.

Potential Assessment of Visual Efficiency (continuing)

Purpose: To develop an assessment instrument useful in evaluating the potential for visual efficiency of young children and young children with multiple impairments, in addition to a visual disability

Project staff: Sheri Moore, Project Director
M. Beth Langley, Project Author and Project Codirector

Background. M. Beth Langley, author of the Functional Vision Inventory, has developed an instrument specifically designed to measure visual potential for visual efficiency in visually impaired multiply handicapped children. This new instrument is entitled The Potential Assessment of Visual Efficiency.

Work during FY 1991. An array of literature in several disciplines has continued to be sourced, surveyed, and integrated into the assessment. Journal articles were read and incorporated in disciplines including developmental medicine, child neurology, ophthalmology, pediatrics, brain research, pediatric ophthalmology, physiological psychology, psychology, low vision, developmental disabilities, and child development. In addition, a number of modifications and refinements continue to be made to the instrument. Pull out sections, useful in evaluating certain children, were designed and incorporated. Section examples include cortical visual impairment and procedures for working with very young children.

The basic format of the assessment is as follows:

Demographics
Physical readiness
Medication
Time of assessment
Seizure activity during assessment
Reaction to handling
Posture and movement components
Structural status
Vision structure and function
Orientation and mobility
Functional use
Physiological status
Visual behaviors
Gaze
Eye movements
Visual fields
Cortical visual impairments status
Acuity
Levels of stimuli and responses
Stimuli processed
Response patterns
Visual perception

Summary and impressions
Current level of visual functioning
Visual variables
Skills to be developed and/or refined

The format has been modified and enhanced with the goal of making it easier to use and rate. A great deal of work has also been done in writing directions for use of the instrument. These directions are very comprehensive and detailed. A formative evaluation was conducted of the Potential Assessment of Visual Efficiency. Revisions were made to the assessment, based on the results of the formative field trial.

Work planned for FY 1992. Strong consideration will be given to the inclusion of a materials component. An additional field evaluation will be arranged and conducted incorporating both content/expert reviewers and teachers. Staff will make arrangements for this field evaluation and will also design needed evaluation forms. The results of this evaluation process will be used to revise and improve the Potential Assessment of Visual Efficiency prior to its entry into the production pipeline. Appropriate production documents will be prepared to facilitate the production of this instrument.

Braille

Read Again: A Braille Program for Adventitiously Blinded Print Readers
(completed except for final report)

Purpose: To develop a set of materials designed to teach braille to persons who lose their vision after initially learning to read print

Project staff:
Hilda Caton, Project Director
Eleanor Pester, Assistant Director
Eddy Jo Bradley, Directing Editor
Fred Otto, Assistant Editor
Karen Poppe, Project Assistant

Background. A complete set of materials was designed to teach braille reading to persons who lose their vision after initially learning to read print. This set of materials was reviewed by the project's consulting committee. Pending revisions, the program was approved for production by APH's Publications Committee. Revisions of two of the beginning levels introducing braille letters, numbers, and basic punctuation were made and the levels were again reviewed by the committee. Following this meeting, these levels were once again revised to reflect the committee's suggestions, completing work on the part of the program dealing with Grade 1 Braille.

Then the part of the program dealing with Grade 2 Braille was revised and new reading applications were selected, copyright permissions were secured, and some readiness materials of special relevance to the target population were written. The entire program was copyedited and content problems were cited. The research staff met together, reviewed the entire program, and made decisions about the problems that had been cited. Following this meeting, further copyediting was done based on decisions the group had made. Additional practice materials available from APH were referenced.

Detailed specifications were written for brailling and one copy was marked up for recording. Level A was brailled on plates and the decision was made to wait until typesetting was completed before continuing with brailling and recording. All levels were marked up for typesetting by Eddy Jo Bradley. The research staff worked with the typesetter to produce satisfactory galleys. The galleys for all the levels were dummied up, artwork was added, and front matter was completed. Proof copies of the entire program were returned from the typesetters and checked and double checked by the research staff.

The research staff continued to work closely with the production staff to prepare Read Again. Level B was recorded. Levels B through I were brailled, proofed, corrected, and put on plates.

Work during FY 1991. Final corrections in the typesetting based on changes made during brailling were completed. Production of Read Again was completed and the program became available in February 1991. Two studies also grew out of this project---a survey of the adventitiously blind enrolled in braille instruction and research on optimum braille size and spacing for initial braille instruction. An article based on the survey which had been submitted for publication previously was revised and an article on braille size and spacing was written. Both articles were submitted for publication.

Work planned for FY 1992. The two articles mentioned have been accepted for publication in RE:view and should be published during this year. A final report on the project will be written.

Braille Language Program (continuing)

Purpose: To develop a set of beginning language materials consisting of two components, spelling and English, which will minimize problems in these curricular areas commonly encountered by beginning braille students

Project staff:
Hilda Caton, Project Director
Eleanor Pester, Assistant Director
Karen Poppe, Research Assistant
Eddy Jo Bradley, Directing Editor
Eric Hamp, Linguist

Background. This project was partially funded under a grant awarded to the APH by the Federal Research in Education of the Handicapped Program's Field Initiated Research competition which is administered by the Special Education Programs, Office of Special Education and Rehabilitative Services, U.S. Department of Education. The resulting product has been approved for production.

Work began on the project in January 1984. Information on achievement in language, spelling, and word study skills was obtained through administration by teachers of a special braille edition of the Stanford Achievement Test, Intermediate I, Form E to 57 blind 4th and 5th grade students to identify specific problems. Analyses were made of current spelling and English textbooks and of Patterns: The Primary Braille Reading Program. This information was used to develop the program.

The program consists of four levels, A through D. Each level of the program was drafted, reviewed, revised, and sent to pilot test sites for evaluation. Then the consulting committee met and reviewed the materials. Further revisions were made based on these evaluations.

These materials were then placed with over 50 students and approximately 20 teachers at field test sites across the country. Annual visits were made to the sites to explain the field evaluation procedures, to check on progress, and to observe the materials in use. Criterion-referenced tests were administered as the children completed each level. Test results were sent to APH for scoring and analysis.

Federal support for the project ceased December 31, 1989, at the end of the project's 5th year, but field testing of the materials continued with new materials sent to the field test sites as students were ready for them. Revisions of the materials based on the field evaluations proved to be extensive.

Work during FY 1991. All field test sites were contacted during this school year and visits were made to teachers in Colorado and Tennessee who were new reviewers. At this time, 9 teachers in six states were still working with 9 students on Level C and with 17 students on Level D. Production specifications for Level A were written and final copy editing and correcting of Level A were completed. Level A was marked up for typesetting. Forty-five lessons on Level B were revised.

Work planned for FY 1992. Levels A and B materials will be produced and will be ready for distribution and use at the beginning of the 1992-93 school year. Since the majority of the students involved in the field testing are through with Level C, plans are to proceed with final revisions of Level C as soon as Level B production preparation has been completed. Field testing of Level D will continue during the 1991-92 school year with 13 students and 7 teachers.

Grade 2 Braille Cards (completed)

Purpose: To develop a set of cards with Grade 2 Braille units on one side and the Grade 2 Braille equivalent on the other side to be used with adventitiously blinded teenagers and adults who are learning braille or with younger braille readers who have been introduced to braille but need identification or spelling practice

Project staff: Eleanor Pester, Project Director

Background. This product was first conceived in 1987 when plans were underway to expand the Dolch Word Cards. Teachers of braille from both schools and rehabilitation centers who were questioned felt that such cards would be useful for their students. Grade 2 Braille Cards were approved for production at the annual meeting in October of 1987. No further research on this product was anticipated since the braille units themselves were set and a similar format to that for the Expanded Dolch Word Cards would be used. Work on this product was expected to begin soon after work on the Expanded Dolch Word Cards was completed. When specifications for production of the Grade 2 Braille Cards were being written, questions arose concerning what to include to make this product most useful. To get input from braille teachers to determine the final specifications for this product, a brief questionnaire was developed and sent to nine braille teachers with experience working with the target population. Information from the seven completed questionnaires was used to write the final specifications for this product. Then, although work on this product was thought to be complete, it ran into a snag in production. When the print sheets for the cards were being run through the braille presses, a copy of the cards was pulled and sent to the research staff for approval. Examination showed that a number of the dots on this copy were weak and some were squashed. This was attributed to the paper which seemed to be wearing out the braille plates even though it was the same kind that had been used previously for the Expanded Dolch Word Cards, but from a different producer. To remedy this situation, braille samples were produced on a number of different papers which were then judged to be acceptable or unacceptable and ranked for acceptability by four braille experts. Five hundred copies were made of the two most acceptable papers and copies #1 and #500 were compared for effects of plate wear by the same four experts. Both were judged to be generally acceptable, but there still seemed to be some problems where corrections had been made in the plate or where interpoint dots fell very close together.

Work during FY 1991. Work to produce a quality product continued with the review of proof copies. The Expanded Dolch Word Cards were approved and successfully run early in the year, but the quality of the braille on the Grade 2 Braille Cards continued to be a problem. In an effort to strengthen the dots on the braille plates used for printing, new plates were brailled which, for the most part, did not use interpoint braille. This seemed to produce satisfactory braille and production was completed.

Braille Line Length Study (discontinued)

Purpose: To compare reading speed and accuracy under three conditions--(1) paper with 40 cell lines, (2) paper with 20 cell lines, and (3) VersaBraille with 20 cell lines

Project staff: Eleanor Pester, Project Director
Joe Petrosko, Design and Evaluation Specialist
Karen Poppe, Project Assistant

Background. With the advent of paperless braille devices such as VersaBraille, the question of the optimum length for a braille display has arisen. At the present time, cost is a prohibiting factor, limiting the length of the display line. However, if a longer line was found to be sufficiently superior to the 20 cell line in general use, the increased cost might be justified. As technology and cost become less limiting factors, line length becomes an important question. Surprisingly, a review of the literature has turned up no research on this question.

A study comparing reading speed and accuracy of experienced adult VersaBraille users under the three conditions described in the purpose was designed. Three passages of approximately 500 words each and of comparable difficulty and interest were selected for this rate study. The Cloze Technique, how it relates to visually impaired persons using braille, and the variation used in the reading rate test where subjects are asked to identify words that do not belong as they read were investigated and were applied to the test material for a broad check of comprehension.

Before the test materials could be prepared, a survey was conducted to determine whether participants use the older VersaBrailles which use cassettes or the newer ones which use disks and whether participants are familiar with the IRS code, the newer BANA code, or some other code. Telesensory Systems, Inc. furnished a list of VersaBraille users who were surveyed and from which the subjects for this study were expected to be selected. The questionnaire was prepared in both braille and print and sent to VersaBraille users in five states. Only 34 VersaBraille users responded to the survey indicating their willingness to participate in this study.

Work during FY 1991. Although efforts were made to locate a sufficient number of suitable subjects for this study, only a small number of scattered subjects were located making travel for testing costly. Test materials would also be costly since potential subjects used a variety of codes and VersaBraille equipment. Since technological developments with paperless braille displays, which seemed to warrent this research, have not to date lived up to their potential, the decision was made to discontinue this project.

Work planned for FY 1992. A final report will be written to document the work which was done on this project.

Linguistic Analysis of American Literary Braille, Grade 2 (continuing)

Purpose: To conduct a thorough and systematic linguistic analysis of American Literary Braille, Grade 2, which will incorporate the new braille terms developed for Patterns: The Primary Braille Reading Program

Project staff: Hilda Caton, Project Director
Eric Hamp, Linguist
Karen Poppe, Project Assistant
John Siems, Data Analyst and Computer Programmer, APH

Background. No systematic analysis of American Literary Braille has been conducted. The British have completed a major contraction study of their system which includes frequency of occurrence of braille contractions in written text. That study, however, did not consider a grouping of braille configurations (contractions) which was different from the groupings now in use. This linguist analysis of American Literary Braille is somewhat similar to the British study except that it uses the new terms (groupings) used in the braille reading and language programs developed at APH and will extend the analyses to areas not included in the British study. The basic plan included the following steps:

1. Selection of appropriate text materials for the analysis
2. Marking (or bracketing) of the braille configurations defined in Patterns: The Primary Braille Reading Program
3. Counts of the frequency and order of occurrence of those elements in the text materials
4. Revision of the order and groupings of braille rules in the publication English Braille: American Edition 2 with an emphasis on more effective orders and groups for teaching purposes
5. Publication of various types of materials to assist in the teaching and learning of braille

Some of the text materials were selected and the analyses begun. These text materials consist of 25 samples from the corpus which forms the basis of the publication, Computational Analysis of Present-Day American English (Kucera, H., & Francis, W. N., 1967), generally known as the Brown Corpus. This publication contains 1,014,000 words and consists of 500 samples each of about 2,000 words, taken from contemporary publications in American English. The 25 samples used in the analysis are representative of all types of literature in the Brown Corpus.

The computer translation of the selected samples from the Brown Corpus was completed, printed, and proofed. The line by line marking and counting of all braille units, contractions, composition signs, punctuation, and numbers (alphabetic and numeric) continued and some preliminary results were tabulated. The marking and counting of various other types of braille units continued (i.e., the frequency of occurrence of certain braille units which occur in several different forms depending upon where they occur in a line, next to punctuation, etc.). Further analyses were made of the braille units already identified and a report was written describing the completed part of the analyses and the implications for teaching and learning of the braille code.

Work during FY 1991. Counts of all braille units--letters (alphabetic and nonalphabetic), grams, punctuation, and registers--were completed line by line for each of 25 articles and a total of all 25 articles combined. Eric Hamp, John Siems, and Hilda Caton collaborated on, and completed, what will be the first of several articles based on data resulting from this study.

Work planned for FY 1992. The following analyses will be completed:

1. lower signs (written vs. contracted) and spacing
    a. incidence of word to
    b. incidence of words by, be, his, was, were, enough, into, in
2. correlations with print in length (e.g., mother is a six letter word in print and a one cell contraction in braille)
3. count of logograms, phonograms, and morphograms
4. capitalization study for comparison with British braille

Adult Braille Writing Program (continuing)

Purpose: To develop an instructional braille writing program for adults with both slate and stylus and braillewriter components

Project staff:
Hilda Caton, Project Codirector
Eleanor Pester, Project Codirector
Eddy Jo Bradley, Materials Developer
Betty Wommack, Materials Developer

Background. To provide a truly comprehensive program in braille instruction for adults, it is necessary to teach students how to write as well as how to read braille. There is very little research available on braille writing for either children or adults. A survey done by Lowenfeld, Abel, and Hatlen (1969) reported that braille writing was usually introduced to children at the same time as braille reading and that the braillewriter was usually used to teach braille writing. No other research is available on braille writing instruction. This includes research on the use of the braillewriter and the slate and stylus for children or adults.

From the time planning for Patterns: The Primary Braille Reading Program and Read Again: A Braille Program for Adventitiously Blinded Print Readers began, the need for formal braille writing instruction was recognized. An introduction to the use of the braillewriter for children was written as part of the Braille Language Program. This could be revised for use with adults. Also, during the past few years several slate and stylus programs for children and adults have been developed. A review of these showed that a program by Betty Wommack most closely corresponds to the philosophy of slate and stylus instruction which has been developed at APH. Betty Wommack has been contacted and is willing to assist in preparing this program for adults. The completed program would consist of a braillewriter and slate and stylus program.

Work during FY 1991. Hilda Caton and Eleanor Pester met with Betty Wommack, the author of an unpublished slate and stylus program for children, whose philosophy they endorse, and discussed changes that would be needed to use this program with adults. Betty Wommack then revised the program based on this discussion. The possibility of developing a device with pegs which could be pushed from one side to the other in about 10 cells to simulate writing and then reading braille on a slate was explored with Tom Poppe.

Work planned for FY 1992. Betty Wommack's revision of the slate and stylus program will be reviewed and revised and/or expanded as needed. Tom Poppe will develop the slate and stylus device. The introduction to the braillewriter from the Braille Language Program will also be revised so that it is appropriate for use with adults. The Swing Cell will be used with this part of the adult braille writing program.

Development of Guidelines for Literacy: Selecting Appropriate Learning Media (continuing)

Purpose: To develop a set of guidelines/criteria to assist teachers in selecting the primary reading medium or media for visually impaired students with some remaining vision

Project staff: Hilda Caton, Project Director
Eleanor Pester, Project Associate Director
Karen Poppe, Project Assistant

Background. At the present time, a great deal of attention is being given to the overall question of developing literacy in visually impaired children. Literacy, the ability to read and write, is a prerequisite to communicating appropriately, competing effectively, and ultimately, attaining success in life. Many persons, both consumers using braille and service providers who teach or produce materials themselves have become concerned that the number of braille readers and writers in the United States is decreasing and they believe that many visually impaired children are not receiving adequate (or any) instruction to aid them in becoming truly literate adults. In particular, it appears that many children who have some remaining vision are not being provided the opportunity to learn braille. Guidelines are needed for the selection of appropriate learning media for visually impaired children who do not fit neatly into the categories of braille or print users. Obviously students with mild vision losses will use print and students who are totally blind will use braille.

APH's Educational Research and Development Committee requested APH bring together national experts in this area to develop a set of guidelines, or criteria, to assist teachers, parents, paraprofessionals, and others who are directly responsible for determining which children should use braille as their primary learning medium. Also, the guidelines will address when the instruction in braille for children with degenerative eye conditions should begin.

A committee meeting was held at APH on June 8-9, 1990, to develop the guidelines. A decision was made to write and publish the set of guidelines if a consensus was reached at the meeting and, if no consensus was reached, a detailed report of the meeting would be published.

Work during FY 1991. A document was developed resulting from the June 1990 meeting. It was initially drafted at the meeting, then put together and sent out to the Committee for review. Revisions were made from comments received and the document was once again sent out for review. A final draft was developed following final review. It will be published as Print and Braille Literacy: Selecting Appropriate Learning Media. The document will contain information pertaining to the major principles which should be understood, suggested areas for assessment and evaluation, and guidelines for decision making in the selection of a learning medium or media for visually impaired children. In addition, it will provide annotated bibliographies of selected resources, references, statistical data, a list of functional vision assessment instruments, and other information related to this critical problem.

Work planned for FY 1992. The final draft of this document will be completed and published in regular print, large type, and braille editions.

Braille Needs Meeting (completed)

Purpose: To determine priorities for future research and product development in braille

Project staff: Hilda Caton, Project Codirector
Eleanor Pester, Project Codirector

Background. Since many of the braille research and development projects being conducted by the Department of Educational and Technical Research are nearing completion, it is necessary to begin planning for future projects. There are many research needs in this area and, in order to meet the most critical needs, it is desirable to form a committee of persons who are working directly with children and adults who use braille as their learning medium to determine priorities for future projects.

Work during FY 1991. A committee meeting was held at APH on March 8, 1991, to identify braille research and development needs and to determine priorities for attempting to meet these needs. Results of this meeting were a number of projects identified in four major areas. Prioritized for implementation, these areas were (a) assessment, (b) organizational skills, (c) materials development, and (d) basic research. A report detailing the results of this meeting and listing specific projects in these areas has been written and is available for future reference.

Press Braille Paper Study (new)

Purpose: to determine user opinions and preference for four kinds of braille paper

Project staff: June Morris, Project Codirector
Debbie Willis, Project Codirector

Background. APH has been using a paper manufactured by Howard Mills for its press braille products. This is an extremely high quality paper that is also extremely expensive. In an effort to identify possible options, a study will be made comparing user acceptance of four braille papers produced by different manufacturers. These are Howard Mills, Scott, Sorg, and Gladfelter.

Work planned for FY 1992. Through its own fund-raising efforts, APH is able to provide The Reader's Digest in braille and recorded on discs to subscribers at no personal cost. In the fall of 1991, the braille edition of the magazine will be changed from a three-volume to a four-volume format. This is in response to user wishes for a size that is less unwieldy. APH will evaluate the experimental papers when the magazine changes to the four-volume format. Approximately 320 names of subscribers receiving the braille edition will be randomly selected from the mailing list to receive the experimental edition in which each of the volumes will be brailled on different papers. To control for the effect of order of presentation, each volume will be prepared in all four paper types and the experimental editions will be collated such that the order of the paper types presented is systematically varied. A questionnaire, pencil, and preaddressed return envelope will be included with the experimental packet.

Educational Measures

Assessment of Braille Skills (continuing)

Purpose: To develop, or adapt, a test or tests that will assess the braille skills of school age students and adults seeking employment

Project staff: Bill Duckworth, Project Codirector
Hilda Caton, Project Codirector

Background. APH's Educational Research and Development Committee requested APH develop, or adapt, an instrument that could be used to assess the braille skills of blind students and adults, with particular attention being given to its use for employment purposes.

Work during FY 1991. In FY 1990, preliminary work was done. This included in-house discussion of possibilities, collecting catalogs listing such tests, and contacting various test publishers. Specifications for this test, or tests, were developed. These were a topic for consideration as general test needs were identified (see "New Educational Measures Identification") and at the "Braille Needs Meeting." In FY 1991, due to demands of staff time, little work was done on this project. Contacts were made and project consultants identified. A meeting was held on March 19, 1991, with project consultants to consider the general question of test needs for transition and adults. The primary recommendation of the committee was that project staff visit rehabilitation agencies, including Veterans Administration agencies, to (a) see what kinds of assessment materials are available and being used and (b) to query vocational counselors about the kinds of information they need to place clients in appropriate jobs.

Work planned for FY 1992. Project staff will visit rehabilitation agencies to identify tests in use and the types of additional measures needed to evaluate work related skills in the blind clients they serve.

Brigance Diagnostic Inventory of Early Development (yellow) (continuing)

Purpose: To provide a tactile supplement to this Inventory for blind children ages infancy through 7

Project staff: Bill Duckworth, Project Director
Josephine Stratton, Research Intern (formerly)

Background. This Inventory is being revised by its publisher. A new edition is expected in 1991. The publisher has said most of the competencies will remain in the same order with much of the material remaining intact.

The adaptation of format has been done on the previous edition. All activities have been assigned a label as to what steps the teacher will take in assessment such as using the supplement, using the print edition with modification, etc. One section, General Knowledge and Comprehension, was completed and evaluated to determine if the format was appropriate. However, a decision was made to put the project on hold until the new edition is released in order that the supplement from APH be for use with the newer edition. The Inventory was approved for production by APH's Publications Committee.

Work during FY 1991. No work was done during the year. However, the new print edition was released in the spring of 1991.

Work planned for FY 1992. A tactile supplement for this inventory will be completed making possible its use with blind children.

Contract Braille and Large Type Tests (continuing)

Purpose: To adapt tests for school systems and states

Project staff: Bill Duckworth, Project Director

Background. Each year APH deals with test developers and states in the adaptation of braille state competency tests and the enlargement of these tests for large type readers. In addition, APH personnel consult with state personnel and voluntary braille transcribers regarding the braille adaptation of their own tests. Whatever services, especially in braille adaptation, local communities or state educational departments need are made available by APH. Some of these include:

1. the complete adaptation of a competency test
2. consultation with adapters who do not know test construction
3. proofreading of braille tests adapted at local or state level

APH feels that these services, or any others a system might need, are very important as many decisions are made on the results of a student taking a competency test. Reviewing volunteer-transcribed tests has emphasized that any test transcribed should include the help of one trained in psychometrics.

For some years, APH has adapted the state tests of Florida, Ohio, and South Carolina by special arrangement through their state departments. Information on the approach used by each of these states is available.

Work planned for FY 1992. Continuation of above.

New Educational Measures Identification (new)

Purpose: To identify widely used academic tests for which braille and/or large type editions are needed

Project staff: Bill Duckworth, Project Director

Background. Since the 1920s, APH has provided academic tests for use by the population it serves. Efforts are made to provide those tests most commonly used throughout the country.

Work during FY 1991. A search has been made of the catalogs containing academic measures as well as those that would be useful to determine various abilities when a student or rehabilitation client is making that transition from school/training to work. The revision of the Boehm was ordered and examined by those involved to determine whether it should be adapted, another test measuring these concepts should replace it, or whether the Brigance materials do a satisfactory job. No determinations of either of the above or other issues have been made. It was decided during this period that two groups (rehabilitation experts and psychologists concerned with the school aged student) convene to examine the instruments found and discuss the issues in determining the direction of test development and adaptation during the next few years. In addition to the above, a survey was conducted of test publishers and through the APH Slate requesting information on well accepted tests and the present needs in the field. Little response was obtained from these last activities. A needs meeting was held on March 18, 1991, during which numerous tests were considered. The measures identified as most needed were the Spache Diagnostic Reading Skills and the new Boehm Test of Basic Concepts--if feasible for young blind children to make the tactual discriminations required.

Work planned for FY 1992. Braille and large type editions of the Spache test will be developed and the feasibility of use of a tactile edition of the Boehm test with young blind children determined.

Microcomputer Applications

Process and Information Dissemination

Eighth Microcomputer Advisory Committee Meeting (series)

Purpose: To identify and determine priorities for needs for educational materials to support use of microcomputers

Project staff: Debbie Willis, Project Director
Larry Skutchan, Project Assistant
Venus Elder, Project Assistant

Background. An advisory group was formed in 1984 to provide specific information and guidance on a continuing basis in the area of technological needs and applications. Seven microcomputer needs meetings were held with the advisory group at APH. They were in August 1984, March 1985, October 1985, September 1986, September 1987, September 1988, and September 1989.

Work during FY 1991. The Eighth Microcomputer Advisory Meeting was held January 27-28, 1991. The committee made the following recommendations:

1. APH PocketBraille. Correct random data loss within this year. Add search-and-replace and cut-and-paste capabilities.

2. LetterTALK+. Complete LetterTALK+.

3. Talking Literacy Kit for Apple II Computers. Complete the Talking Literacy Kit for Apple II Computers.

4. Manuals. Complete the Appleworks Tutorial on cassette and the Appleworks Reference Manual on disk.

5. Enhanced Teacher's Pet. Make Teacher's Pet the foundation for requested drill-and-practice software. Make large print available on screen and as a print option. (Printer of choice is the ImageWriter.) Add CTRL-E commands if they are not already included, and make user-modified pronunciation savable. Data files should be formatted textfiles to facilitate grade 2 translation.

6. Telecommunications. Disseminate information on Kermit availability. Look into adapting a telecommunications simulation program and include this information in the fourth Micro Materials Update telecommunications article. The committee, keeping in mind the workload of the Micro Group, did not give the following a high priority rating, but expressed a great need for a kit which introduces teachers/students/clients to telecommunications. A "cookbook" style manual plus a simulation program is needed. There was discussion of an APH electronic bulletin board, but it was not recommended that APH pursue managing a bulletin board at this time.

7. Typing Program. Write a typing program similar to Talking Typer for the IBM. Consider adding a teaching component to this program which would include information on correct posture and which fingers to use to type particular characters.

8. The committee suggested using Teacher's Pet to develop programs in the areas of high interest, low vocabulary, age appropriate software and early childhood software; and in the area of math drill-and-practice (a priority from the Seventh Microcomputer Advisory Committee Meeting).

9. Resource Guides and Data Disks. Publish resource guides, possibly in a newsletter such as the Micro Materials Update or APH Slate, with information on adapting early childhood software and high interest low vocabulary age appropriate materials.

10. Large Print. The committee recommended that future software from APH include both speech and large print output to the screen. They advised that, if possible, large print output be available to the printer as well. The committee further recommended that APH's Micro Group give consideration to motivational characteristics such as color, graphics, sound, reinforcing statements, etc. when developing or adapting software.

11. Micro Materials Update. The committee recommended that when necessary (e.g., when seeking ideas on adapting early childhood materials and high interest low vocabulary age appropriate materials) the Micro Group should ask for specific information in the Micro Materials Update.

12. Lab Packs. The committee expressed a great need for making APH software available in lab packs. They do not want the consumers to be required to purchase and store multiple binders with hardcopy manuals.

    It should be noted that the previous seven microcomputer advisory committees chose to focus on providing computer-related materials for totally blind individuals. This committee was the first to ask APH to begin focusing on aspects of computer-related materials needed by low vision as well as totally blind persons.

13. Hand-held Scientific Calculator. A talking hand-held scientific calculator with a large print display and an earphone jack is desperately needed for students in grades 10 and above. Explore the possibility of providing such a device.

The above recommendations are not listed in order or priority, except for #1 which was given top priority.

The participants of the Eighth Microcomputer Advisory Committee recommended that the following projects be discontinued:

1. World Book Encyclopedia, CD-ROM version

2. Future development Speaqualizer/Speaqualizer MC

3. Spanish-speaking Speaqualizer

Some additional notes of interest resulting from this meeting included:

> The committee commended APH for bringing Talking Typer and Textalker-gs to market, and for the articles on telecommunications which have appeared in recent issues of the Micro Materials Update. The participants of the Eighth Microcomputer Advisory Committee meeting recommended that APH provide the Committee members with quarterly updates so that the Committee can follow progress and participate in the rearrangement of priorities as circumstances warrant.

Following the Eighth Microcomputer Advisory Meeting, an in-house meeting was called to discuss the various recommendations of the microcomputer advisory committee. It was determined by the APH Microcomputer Group and Director of the Department of Educational and Technical Research that a talking authoring program would satisfy some of the priorities discussed at the Eighth Microcomputer Advisory Meeting.

The three new priorities:

1. to develop a talking authoring program for use on Apple IIs, Macintoshes, and IBMs,
2. to develop a large print program for the Apple IIGS, and
3. to develop a talking typing program similar to APH's Talking Typer but for use on IBMs and compatibles

were then discussed with the Research and Development Committee at the 1991 Interim Meeting.

The Research and Development committee members at the 1991 Interim Meeting questioned the need for these three types of software programs and recommended:

1. that APH contact members of the Microcomputer Advisory Meeting to get further clarifications, suggestions, comments, criticisms, considerations, and priorities on the three new projects mentioned above,
2. that APH survey the field to determine the need for the three programs in question, and
3. that APH search for programs which already exist that might meet the need for one or more of the three types of programs under investigation.

Work planned for FY 1992. Members of the Eighth Microcomputer Advisory Meeting will be contacted regarding concerns expressed by the Research and Development Committee at the 1991 Interim Meeting. A questionnaire will also be developed regarding the need for (a) an authoring program for Apple IIs, Macintoshes, and IBMs, (b) a large print program for the Apple IIGS, and (c) a talking typing program for IBMs and compatibles. The survey will be sent to appropriate persons. At the same time, a search for programs that already exist to meet the need for one or more of the three programs in question will be conducted. Responses to the survey will be compiled and results of the data collected will be reported to the Research and Development Committee at APH's 1991 Annual Meeting. On the advice of the Research and Development Committee and in light of the results of the data collected, the needs in this area will be reprioritized.

Two subcommittee meetings are also planned for FY 1992; one on high interest low vocabulary age appropriate software lessons and one on drill-and-practice math programs. (See the write-ups on High Interest Low Vocabulary Age Appropriate Software and Drill and Practice Math Programs for additional information.)

Monitoring Technological Developments (formerly entitled Survey of Products Being Used and Products in Need of Development for Legally Blind Persons Using Microcomputers) (continuing)

Purpose: To determine the greatest unmet needs of the field and set priorities appropriately by gathering information on the current "state of the art" of microcomputers, potential applications of technology, and developmental needs in the area of microcomputers for visually impaired persons

Project staff: Debbie Willis, Project Codirector
Larry Skutchan, Project Codirector

Background. When APH became interested in developing microcomputer related products in the summer of 1983, it was necessary to determine the greatest needs of the field and set priorities appropriately. Information regarding the "state of the art" of microcomputers, potential applications of technology, and developmental needs in the area of microcomputers for visually impaired persons was gathered during the fall and winter of that year. Recognizing, however, that this is a rapidly changing field, a second survey was conducted in the winter and spring of 1986. These two surveys provided valuable information for planning and decision-making during APH's early involvement in this area.

As the use of computers increased, trends and changes in the computer industry and in education were monitored through literature reviews, attending conferences and exhibits, and talking with a variety of people involved in computer technology. Since these sources of information have become available, it has not been necessary to conduct another major survey. Brief surveys and subcommittee meetings have been conducted as the need arose.

Work during FY 1991. Trends and changes in the computer industry and educational applications of the technology continued to be monitored through literature reviews, perusal of SpecialNet and GEnie bulletin boards' information, talking with vision teachers, computer resource personnel, rehabilitation specialists, software and hardware developers, vendors, blind computer users, and others.

Work planned for FY 1992. Trends, changes, and needs will continue to be monitored as they were in FY 1991. Brief surveys and subcommittee meetings will be proposed as the need arises.

Observation and Information Dissemination (continuing)

Purpose: To gain insight into user problems by observing students at the computer and to disseminate information on current uses of technological aids through workshops, presentations, and other means

Project staff: Microcomputer Group

Background. The Fourth Microcomputer Advisory Committee recommended the microcomputer group help disseminate information about relevant technology to the field. Additionally, the meeting of the interim committee in May 1985 resulted in a strong recommendation that the microcomputer group observe students using APH computer products. To this end, the microcomputer group conducted the summer workshops in June 1986, presented microcomputer materials at several conferences, and observed students on a weekly basis at the Kentucky School for the Blind.

During FY 1990, the microcomputer group along with members of APH's Department of Educational and Advisory Services continued presenting and demonstrating APH microcomputer materials at relevant conferences. Interested students, teachers, and computer users that visited APH also received detailed product information and demonstrations upon request.

In addition, several members of the Microcomputer Group observed students of varying ages using a variety of software. Interested users and potential consumers' questions concerning computer software and hardware products continue to be answered.

Furthermore, an annotated bibliography on technology-related topics from 1980-88 for visually impaired persons was updated to include relevant information from 1986 to early 1990. The bibliography was made available free of charge on 5 1/4" disks formatted for Apple II computers. The bibliography consisted of two AppleWorks files: annotated file (wordprocessor) and initial information file (database).

Student observation, or information gathering, was conducted concerning technological aids and software. These included:

1. The Disabled Citizens Computer Center--special education software, assistive devices, and adaptive firmware card.
2. IBM's TLC (Teaching and Learning with Computers) 2nd-6th grades: reading, language arts, and math
3. IBM's "Get Set" (4 year old prereading program) and "Writing to Read" (K-1 Whole Language Reading program)
4. IBM's PALS program (Principle of Alphabet Literacy System) Adult Literacy

5. IBM presentation of assistive devices, software, and the National Support Center for Persons with Disabilities

6. Assistive Devices and Special Education Software: Kentucky School for the Blind and Churchill Park School

7. Sending for information concerning the following topics: early childhood and microcomputers, math programs, and high interest, low vocabulary materials

8. Street Electronics updated listing of ECHO compatible programs

9. Adhoc Reading Systems demonstration: Kentucky School for the Blind

10. Public school students (second grade) working in computer lab using MECC and Sunburst programs: Price Elementary School

11. A member of the Microcomputer Group offered a course called "Basic Computer Programming" at the Kentucky School for the Blind.

Work during FY 1991. Updating the annotated bibliography on technology-related topics applicable to visually Impaired persons was completed. The updated bibliography includes information from 1980 to early 1991. It was made available free of charge on 3 1/2" disks formatted for Apple II computers. The bibliography continued to be set up as two Appleworks files; a word processed annotated file and an information file on database. Presentations and demonstrations on computer products and services continued to be given during this time period. Responsibility for the latter was shared with the Department of Educational and Advisory Services. Members of that department attended numerous conferences where they exhibited APH's computer-related products. Members of the Department of Educational and Technical Research and the Department of Educational and Advisory Services continued to complete questionnaires from other organizations developing or updating databases on special education hardware, software, peripherals and miscellaneous items, and answered a variety of questions on a daily basis regarding computer products in general, specific computer products, services available, where to find, what's available for, how to do, etc. APH's Micro Materials Update continued to be written and made available to persons included on the mailing list and to those requesting computer-related information.

The Micro Group continued to make an effort to keep up-to-date concerning software programs and assistive devices for visually impaired people. Several of the Micro Group observed students at the Kentucky School for the Blind being introduced to the Nomad, Arkenstone Reader, and Braille Blazer, and observed students using a variety of software. A member of the Micro Group and a member of the Department of Educational and Advisory Services continued to offer classes on computer technology for blind persons. Some members of the Micro Group continued as the editors and writers of the Blind Apple User's Discussion (BAUD). The Micro Group periodically previewed new "talking" software and hardware as it was available.

Work planned for FY 1992. The Microcomputer Group plans to continue attending technology-related conferences, demonstrations, and exhibits of software, hardware, and assistive devices. The group also intends to continue with presentations, demonstrations, and exhibits of APH's computer-related products and the observation of computer users of all ages whenever possible. The Micro Materials Update will be written and made available in the fall and spring. The annotated bibliography on technology-related topics applicable to the visually impaired population will be provided free of charge on 3 1/2" disks to interested persons. Information and answers to a variety of questions regarding computer products in general, specific computer products, services available, where to find, how to do what's available for, etc. will continue to be provided. Members of the Microcomputer Group will serve on committees relevant to the education and rehabilitation of visually impaired persons as needed.

Product Evaluation (continuing)

Purpose: To evaluate user satisfaction with APH microcomputer products, to monitor and improve project planning and management, and to continue the identification of users of APH microcomputer materials

Project staff: Debbie Willis, Project Director
Venus Elder, Project Assistant

Background. From the first software product published by APH, all microcomputer materials have included a self-addressed, postage-paid "User Survey Card" which asked for information which would identify the consumer, product, setting in which the product is used, strong and weak points of the product, suggestions for improvement, current equipment accessible to the user, number of users and their age/grade range, and additional comments. As an assessment instrument for evaluation, these cards provide a valuable source of information which aid in the decision-making process of the staff involved with improving existing products, determining future needs and projects, and monitoring trends in these categories. These cards also serve as a vehicle for identifying users of APH microcomputer material which is useful in finding reviewers of products and potential participants in microcomputer advisory meetings.

Results of the entered data were reported at the Fifth Microcomputer Advisory Committee Meeting. The information received through August 1989 was evaluated during the planning stage of the Seventh Microcomputer Advisory Committee Meeting to see if any pattern in requests was occurring. While there was not a great deal of consensus, the most frequently occurring requests were for talking educational games, how people can make their own software talk, switch-activated software, and software for very young blind children.

As a result of these requests, articles on talking Eamon adventure games appropriate for junior high students and above, talking software and single-switch software for a wide range of ability levels including some appropriate for very young and multihandicapped, an article on public domain software libraries with talking software, articles on making your own software talk, and a write-up on APH's Talking Utilities for DOS 3.3 which includes a program to automatically install speech on a disk, were written and included in the 1989 Winter and Summer issues of the Micro Materials Update.

Complete information from all the "User Survey Cards" continued to be entered into a database during the 1990 fiscal year. Needs expressed by users on the "User Survey Cards" were cataloged and placed into various categories. A report highlighting areas which were cited most often was presented at the June 1990 meeting of APH's Educational Research and Development Committee. The top four categories in order of greatest need expressed were: (1) math (early - upper level), (2) educational games, (3) word processing, and (4) language arts. During the 1990 Kentucky Educational Technology Conference in Louisville, many people who stopped by the APH booth expressed the following need: leisure/enjoyment and/or recreational software for visually impaired and/or multihandicapped elderly persons.

Names and addresses of consumers who returned the "User Survey Cards" were entered into a database to receive free copies of the Micro Materials Update.

Work during FY 1991. "User Survey Cards" continued to be received. The data on the cards were entered into a database of information. A compilation of the data received during 1989 and 1990 was analyzed and written into a brief report for use at the Eighth Microcomputer Advisory Committee Meeting that was held in January 1991. Consumers' suggestions for future software projects, revisions to existing products, and general comments were shared with members of APH's Micro Group and the participants of the Eighth Microcomputer Advisory Committee. The suggestions and comments on the cards were taken into consideration by the staff and committee members in setting new priorities in the area of Technological Needs and Applications.

The participants of the 1991 Braille Needs Meeting identified educational games for use with microcomputers as a high priority need. This information was shared with members of the Eighth Microcomputer Advisory Committee members and will be provided to the members of the Ninth Microcomputer Advisory Committee.

Those consumers who responded to the "User Survey Cards" continued to be entered into the database to receive current and future issues of the Micro Materials Update. Requests for information and difficulties with software that were expressed on the cards were addressed by the Micro Group.

Work planned for FY 1992. The information from the "User Survey Cards" will continue to be entered into a database. The data will be analyzed periodically to study trends, revise current products, assist in future planning, and to identify future software reviewers and potential committee members.

Information Dissemination: Micro Materials Update--newsletter (continuing)

Purpose: To provide a description of completed APH microcomputer materials development projects and other relevant resources for computer products and information to serve as a (a) newsletter for professionals in the field, (b) convenient means of responding to requests for more information, and (c) handout to distribute at appropriate presentations/workshops/exhibits

Project staff: Microcomputer Group

Background. The first Micro Materials Update was generated specifically for the purpose of serving as a handout for a teacher inservice presentation made by APH staff in November 1985. The same year the Microcomputer Advisory Committee recommended adding a column that would include information, in this field, that was being pursued outside of APH. The title of the column became known as "News, Views, and Muse."

Responsibility for the Micro Materials Update was divided between research and marketing staffs. Research was responsible for the content and format of the newsletter, maintaining the database of addresses, and for providing address labels for mailing. The newsletter was made available in braille and print forms. The mailing list continued to grow, giving APH a valuable resource of persons who were buying and using APH software and related products.

The Micro Materials Update was written and disseminated in print and braille twice during FY 1989. Both research and marketing contributed articles. The database of readers continued to be maintained. The Micro Materials Update continued to be provided as a handout at numerous presentations, workshops, and exhibits. For several years, it also served as a quick and valuable response to numerous phone calls and letters regarding APH's computer products.

The Summer 1989 Micro Materials Update and the Winter 1990 issue were written as usual containing articles by both research and customer support staff. The first part of an in-depth series on telecommunications made up the lead story in the Winter 1990 issue; this series was requested by the Seventh Microcomputer Advisory Committee. The pattern of listing all APH computer-related publications and technological products in the Winter issue was continued.

Starting with the Winter 1990 issue, the decision was made to publish the newsletter in large type and cassette instead of large type and braille. This choice will be assessed as responses from readers come in.

Work during FY 1991. After the Winter 1990 issue was published, the Department of Educational and Advisory Services requested that the Micro Materials Update be published in fall and spring instead of winter and summer. The Fall 1990 issue was written, edited, and proofed primarily by members of the Micro Group in the Department of Educational and Technical Research. As requested by the Seventh Microcomputer Advisory Committee, a second in a series of articles on telecommunications was included in this issue. As requested by the Eight Microcomputer Advisory Committee, a third article in the special series on telecommunications appeared in the Spring 1991 Micro Materials Update. Formatting, artwork, coordinating completion of print and recorded versions, and mailing out were the Department of Educational and Advisory Services' responsibilities. The database of names and addresses of those persons to receive the Micro Materials Update was maintained by the Magazine Circulation and Program Support Department.

Exactly 2,500 print copies and 500 cassette copies were produced of the Fall 1990 and Spring 1991 issues. Approximately 2,000 print and 350 recorded copies were mailed to consumers. The remaining copies were used as handouts at conferences and presentations and as responses to inquiries regarding computer-related products and services.

Work planned for FY 1992. A Fall 1991 and a Spring 1992 issue will be published and made available in print and recorded versions during FY 1992.

Microcomputer Applications

Products

APH PocketBraille (continuing)

Purpose: To develop and refine a portable note-taking device

Project staff: Larry Skutchan, Project Director
Fred Otto, Project Assistant

Background. The Kentucky Department for the Blind developed the PocketBraille and PortaBraille. Each is a complete portable note-taking system with braille keyboard, parallel and serial ports, and a speech synthesizer. The PortaBraille additionally contains a braille display. Each contains firmware that makes writing and editing possible. With the approval of its Educational Research and Development Committee, APH began designing a version of this system. It is called the APH PocketBraille. The APH PocketBraille was first marketed in June 1988. Since then, one revision was made and released. It corrects some bugs in the original system, improves speech quality and responsiveness, and compensates for differences in a part that is no longer available in the United States.

Work during FY 1991. Progress on the new revision of APH PocketBraille firmware was brisk. A totally new user interface, operating system, and editor were all designed, written, and, for the most part, debugged.

The new software uses a file metaphor to help insulate the user from hardware restrictions by letting him give his work names. Earlier versions required the user to divide his work into memory banks. This was inconvenient because there were only 7 banks, and each bank was a fixed size. In contrast, the new operating system lets the user give his work names that reflect the contents of the file, and each file allocates memory dynamically, so there is virtually no restriction on the size of a file. In addition, the operating system lets the user have 250 files in which to store his work.

The new operating system, along with the capability of creating files, provides the user a variety of file management functions. These include protecting files, setting the status of the reverse translator, deleting files, inserting other files into the currently opened file, and renaming files. These routines were all written this fiscal year. In addition, another file-related feature was written and installed. It lets the user specify the nature of the work in the file. In other words, the user can tell APH PocketBraille that the file is line oriented. That way, when using the previous and next line commands to navigate through the file, APH PocketBraille always brings the cursor to an appropriate resting point. With line orientation turned off, the cursor moves by sentences. This proves quite convenient for proofreading.

Other work on APH PocketBraille includes a totally new writing environment. In previous versions of the firmware, APH PocketBraille's editor was primitive. It was totally line oriented and not very flexible. A completely new editor was written. It gives the advantage of paragraph orientation and an insert mode that is always active. The paragraph orientation gives the user more power when it comes to inserting large passages or renaming large bodies of text from a document. The insert status lets the user enjoy greater power by providing a more natural and easy way to edit. When the user wants to add text to the middle of a paragraph, the user just moves to the point of interest and types it. The older editor required the user to enter an insert mode, type the text, then exit the insert mode. The older editor also allowed inserting only 255 characters at a time, and there was a noticeable delay while the text was placed into the buffer. The new system shows no delay and has no limitation on the amount of text that is inserted at a time. In fact, as mentioned earlier, the user can actually insert entire files at the cursor.

A new search and replace function was written for the APH PocketBraille's editor. Earlier firmware revisions permitted only finding, but not replacing. The search and replace lets the user replace either automatically throughout a document or individually on a case by base basis.

Other features written and installed in the new editor include deleting to the end of the document, deleting either backward or forward by character, and deleting by words and to the end of a paragraph.

While the operating system and editor represent significant enhancements to APH PocketBraille, the parameter setting method was completely rewritten and a new voice box mode was designed and installed. Earlier revisions of the firmware required the user to know the commands to access parameter settings such as changing baud rate, parity, and data length. Now, when the user presses Chord-P, APH PocketBraille presents a menu showing the settings and the value selected for that setting. The user can select new values by using the previous and next word commands, or select new settings by using the previous and next line commands.

The speech box mode was rewritten. It is now called voice box and it provides some significant features to make APH PocketBraille act as a valuable synthesizer for use with a screen access program on the PC. APH PocketBraille's voice box features a new way of silencing the speech that proves very handy. This new method silences speech to the next phrase which makes scanning through familiar text much more efficient.

Work planned for FY 1992. The APH PocketBraille's new firmware will be tested. Any corrections that require attention will be installed and the manual will be finished.

Authoring Program (new)

Purpose: To allow the APH Microcomputer Group, teachers, and parents to write specialized talking programs as needed

Project staff: Larry Skutchan, Project Codirector
Debbie Willis, Project Codirector
Rob Meredith, Programmer
Venus Elder, Project Assistant

Background. At the Seventh Microcomputer Advisory Committee Meeting, the participants recommended using an authoring program such as E-Z Pilot II to adapt/develop some math drill-and-practice software. At the Eighth Microcomputer Advisory Committee Meeting, the participants recommended enhancing Teacher's Pet to adapt/develop software in areas that had been identified at the Sixth and/or Seventh Microcomputer Advisory Committee Meetings as high priorities (e.g., early childhood programs, high interest low vocabulary age appropriate software, and math drill-and-practice programs).

Work during FY 1991. E-Z Pilot II was purchased to investigate its usefulness. It was found that when combined with an Echo II speech synthesizer, E-Z- Pilot II could be used to create "talking" lessons. The E-Z Pilot II program itself, that must be used to create the talking lessons, does not talk except in review mode when using Textalker-gs. A blind person, therefore, could only create the lessons using speech synthesis when in review mode using an Apple IIGS. Once the lessons were created, a blind individual would have no particular problem using the lessons on an Apple II with speech output. A further limitation of using E-Z Pilot II is that the lessons would be for use on only Apple II computers.

Work planned for FY 1992. The Micro Group will investigate the feasibility of making the E-Z Pilot II program completely speech accessible with TEXTALKER and Textalker-gs. If this is not feasible, or if APH staff along with the current Educational Research and Development Committee determine that a talking authoring program which could be used to create programs for use on Apple IIs, Apple Macintoshes, IBMs and compatibles is feasible and more highly desirable, then APH will begin to investigate development of a talking authoring program. (See the write-up on the Eighth Microcomputer Advisory Meeting for more information regarding the possible development of a talking authoring program.)

The outcome and decisions regarding an authoring program will affect two current priorities:

1. adapting/developing high interest low vocabulary age appropriate programs

2. adapting/developing math drill-and-practice programs

Drill and Practice Math Programs (new)

Purpose: To adapt/develop math programs for practicing/reinforcing skills in addition, subtraction, multiplication, division, decimals, fractions, percentages, grouping, and regrouping

Project staff: Debbie Willis, Project Director
Venus Elder, Project Assistant

Background. At the Seventh Microcomputer Advisory Meeting, a high priority was given to developing talking and large print drill and practice math programs to include addition, subtraction, multiplication, division, decimals, fractions, percentages, grouping, and regrouping. An authoring program called E-Z Pilot II was purchased to investigate its usefulness for this purpose. With E-Z- Pilot II, interactive lessons can be written. When combined with an Echo II Speech Synthesizer, E-Z Pilot II can be used to create "talking" lessons.

Work during FY 1991. At the Eighth Microcomputer Advisory Meeting, the committee again gave high priority to developing drill-and-practice math programs but recommended that an enhanced version of APH's Teacher's Pet be used to develop the math drills.

Some commercial math programs were previewed for concepts covered, order of presentations, and variation in presentation of problems and explanation of solutions. A file of programs and resources was started for future development of this project.

Work planned for FY 1992. A questionnaire will be developed regarding types of math drill-and-practice materials teachers are using (particular curricula, books, or programs and materials they use to reinforce basic math concepts needs. The questionnaires will be sent to appropriate teachers/ professionals. A subcommittee meeting, consisting of approximately four appropriate teachers/professionals and APH's Microcomputer Group will be conducted to discuss basic areas/content the software and support materials should follow (goals and objectives) and what software program should be used to write these lessons. The subcommittee will develop specific computer-related activities needed to achieve the goals. An outline or steps the "lessons" should follow will be developed. The "lessons" will begin to be written. Support materials and documentation will be designed and drafted. After an initial in-house review, the "lessons" and drafted support materials/documentation will be sent to the subcommittee members and to selected members of the Microcomputer Advisory Committee for evaluation. The "lessons" and support materials/documentation will be revised utilizing the comments and suggestions of the consultants and Advisory Committee members.

Enhanced Teacher's Pet (new)

Purpose: To develop a simple authoring system so teachers could easily create lessons and so that APH can quickly supply preprogrammed lessons

Project staff: Larry Skutchan, Project Director

Background. The Eighth Microcomputer Advisory Committee recommended that APH develop a simple authoring system so teachers can easily create lessons and so that APH could quickly supply preprogrammed lessons. One possibility was further enhancing Teacher's Pet to provide more flexability.

Work during FY 1991. The Microcomputer Group has been looking for other authoring systems that might already exist to meet the stated needs.

Work planned for FY 1992. The Microcomputer Group plans to look for a system that generates code that runs on more than one kind of computer.

High Interest Low Vocabulary Age Appropriate Software (new)

Purpose: To adapt/develop high interest low vocabulary age appropriate microcomputer materials for developmentally delayed students junior high and above

Project staff: Debbie Willis, Project Director
Venus Elder, Project Assistant

Background. The Seventh Microcomputer Advisory Committee gave a high-priority to adapting or developing high interest low vocabulary age appropriate software for developmentally delayed blind students junior high and above. In order to identify and determine priorities for this area, a "High Interest Low Vocabulary (High/Low) Age Appropriate Software Needs Meeting" was held. In preparation for the meeting, an annotated high interest low vocabulary bibliography was compiled.

The target audience identified by the High/Low committee members was: Totally blind, marginally academic students, junior high and above, who are behind in reading and math (for a variety of reasons), and are reading at a fourth-fifth grade level. During the meeting, three major priority areas were identified: (1) daily living skills, (2) study skills, and (3) job-seeking skills. Top priority for daily living skills was given to handling money, money identification, making change, and budgeting. The top priorities determined for study skills were outlining, determining important facts, note-taking, and writing papers. The top priorities for job-seeking skills were career exploration and interest assessment.

The Seventh Microcomputer Advisory Committee recommended: (1) that the Micro Group initially create or adapt a single software selection with support materials in each of the three major areas identified; (2) that the computer-related activities within each of the three major priority areas be related to reading, writing, and math; (3) that the Micro Group plan on software being used as a supplement to class or by an itinerant teacher or in a resource room; (4) that the software be reinforced with braille, large type, and/or audio materials for student use; and (5) that if APH develops these programs from scratch, a programming language be used which allows the software to work on IBMs and compatibles and Apple II computers. If this cannot be done or if programs are being adapted rather than developed, make the daily living skills and study skills software usable on Apple II computers; the job-seeking skills software usable on IBMs and compatibles.

Work during FY 1991. Software titles from a variety of companies including MCE, Job World, and Sunburst were previewed for possible project development. A variety of materials dealing with handling money, money identification, making change, and budgeting were reviewed. Concepts were pulled from software which met the project priorities regarding dealing with money. A listing of support personnel and other resources was compiled and a database was started to keep track of the information.

Work planned for FY 1992. Appropriate people will be identified and surveyed regarding the most common/essential concepts of handling money that the targeted population of legally blind students need to know (particular curricula, books, or programs and materials they use in teaching money matters). A subcommittee consisting of approximately four teachers/professionals and APH's Microcomputer Group will meet to discuss basic areas/content the software and support materials should follow (goals and objectives). The subcommittee will work on specific computer-related activities needed to achieve the goals. Once it has been decided what type of program (i.e., Teacher's Pet or a talking authoring program) will be used to create the "lessons." An outline or steps the "lessons" should follow will be developed. The "lessons" will begin to be written and support materials/documentation will be designed and drafted. The initial "lessons" and drafted support materials/documentation will be sent to the subcommittee members and selected members of the Microcomputer Advisory Committee for evaluation. The "lessons" and accompanying materials will be revised based on the field reviews. The revised materials will then be reviewed in-house and changes will be made as necessary. In its last stage, the total program will be reviewed by appropriate consultants and final modifications will be made as needed to complete the project.

Large Print Program (new)

Purpose: To provide large print output to the screen for use by persons with partial sight

Project staff:
Larry Skutchan, Project Codirector
Debbie Willis, Project Codirector
Rob Meredith, Programmer
Venus Elder, Project Assistant

Background. At the first seven Microcomputer Advisory Committee Meetings, the participants chose to focus on providing computer-related materials for totally blind individuals. The committee members felt that a number of commercially available products could be used by partially sighted individuals, but that very little in the line of computer products existed for totally blind persons.

Work during FY 1991. The members of the Eighth Microcomputer Advisory Committee reported that teachers and students need to make use of the same piece of software. As a result, the Eighth Microcomputer Advisory Committee highly recommended that future software from APH include both speech and large print output to the screen. They advised that, if possible, large print output be available to the printer as well. The committee further recommended that APH's Micro Group give consideration to motivational characteristics such as color, graphics, sound, reinforcing statements, etc., when developing or adapting software.

Work planned for FY 1992. APH will initially investigate and possibly begin work on developing a large print boot program for the Apple IIGS. (See write-up on Eighth Microcomputer Advisory Meeting for additional information regarding the possible development of a large print boot program for the Apple IIGS.)

Future software will incorporate improved reinforcing characteristics depending on several important variables including whether the software is being adapted or developed, the particular purpose of the software, time and/or financial allowances for completion of the project, whether expertise to do such is available, particular computer capabilities, etc.

Manuals (continuing)

Purpose: To provide manuals in braille, large type, recorded, or disk form to support use of commonly used microcomputer equipment and programs

Project staff: Debbie Willis, Project Director
Larry Skutchan, Systems Programmer
Fred Otto, Project Assistant

Background. At the Fourth Microcomputer Advisory Committee Meeting, it was recommended that APH continue to provide manuals deemed important in a medium usable by visually impaired persons. In April 1986, Apple offered to supply APH the ASCII text files of Apple manuals for editing and dissemination by APH. The significance of this gesture resides in the fact that an individual possessing the ASCII text file of any work has the ability to output that information in hardcopy regular print, large type, or braille; refreshable braille; or synthetic speech.

Production approval was obtained for the Apple IIGS Owner's Guide and its ASCII text files were received from Apple. Although the idea of a manual reading program did not receive top priority at the Fifth Microcomputer Advisory Committee Meeting, it was decided that a beginning level program for ease of reading text on disks would be written.

During FY 1989, the text files of the Apple IIGS Owner's Guide were broken down by topics into small files and grouped in subdirectories for easy access by the manual reading program. The disk also contains the complete manual in one large file for those who wish to print it out in its entirety and an introduction in braille and large type. The edited version of the disk edition, with additional changes specified by Apple's editors, was approved by Apple.

After lengthy consideration of the implications of allowing manuals on disk to be provided, Apple's Legal Department formalized its Software Licensing Agreement for disk manuals and granted APH permission to publish Apple manuals on disk, in addition specifying that APH will have first choice of which of Apple's manuals to publish on disk.

Apple sent text files of the Apple IIc+ Owner's Guide with permission to produce it on disks as well. APH received permission from Addison-Wesley to produce Applesoft BASIC Programmer's Reference, BASIC Programming with ProDOS, and the Apple IIe Technical Reference on disk. APH personnel also met with an IBM representative to discuss the need for disk versions of IBM manuals. It appears that IBM is interested in working in that direction. IBM manuals can currently be accessed through an on-line communications system called "Book Manager." The user, however, pays a fee comparable to the cost of the printed manual plus the on-line cost.

In FY 1990, the disk version of the Apple IIGS Owner's Guide was made available.

After protracted correspondence with Claris Corporation, APH received permission to publish the Appleworks Reference Manual and AppleWorks Tutorial on disk. Project staff had to devise language for the license agreement which would satisfy Claris' concern over use of the disks by people who are not visually impaired. These two books were given priority over the Apple IIc+ Owner's Guide and the Apple IIe Technical Reference, for which APH has the disks but which have lost some of their initial appeal as projects.

Work during FY 1991. Upon consideration of the presentation of the content in the AppleWorks Tutorial, it was decided that a disk-based version that would be read primarily through a speech synthesizer would not be useful, since the reader would have to stop the manual-reading program and start AppleWorks each time a new series of steps was called for in the Tutorial. Permission was received from Claris Corporation to produce a tape recorded version of the AppleWorks Tutorial, which would allow the reader to move easily between the text and the program. Preparation of the text for recording in the APH studios is complete.

The AppleWorks Reference Manual, which will be produced on disk, has been completely adapted.

Work planned for FY 1992. The AppleWorks Reference Manual will undergo in-house reviews and, after final changes have been made, it will be turned over to production. The two AppleWorks manuals will be produced and sold as a package. Production of more manuals on disk or recording will be weighed against other priorities, timeliness of the materials, sales, and responses to the first products.

MECC Software (continuing)

Purpose: To adapt widely used educational software distributed by the Minnesota Educational Computing Corporation (MECC)

Project staff: Debbie Willis, Project Director
Larry Skutchan, Systems Programmer
Venus Elder, Project Assistant

Background. Participants in the Second, Third, Fourth, Fifth, and Sixth Microcomputer Advisory Committee Meetings and members of the Educational Research and Development Committee at APH's 1986 Interim Meeting and 1988 Annual Meeting assigned high-priority status to the development of speech-adapted software from MECC. This challenge was particularly noteworthy because MECC materials are developed by educators and include a vast collection of titles already available to thousands of school systems nationwide.

General approval for production of speech accessible adaptations of the MECC software was granted with the following priorities: 1. mathematics, 2. science and simple logic, and 3. English, social studies, and writing.

After completing the talking version of Elementary Volume 1--Mathematics, permission was sought and received from MECC to modify three additional selections. They were Food Facts, Elementary Volume 5--Language Arts (Prefixes), and Social Studies Volume 1.

During FY 1989, final modifications were made to the talking version of Food Facts. The supplement, to accompany the talking disk and original MECC manual, was completed. After consultants evaluated Food Facts, and a final in-house review was conducted, the modified version was submitted to MECC for final approval and then turned over to production. This program became available during FY 1989.

Elementary Volume 5--Language Arts (Prefixes) was completely reworked in order to operate more quickly, to keep student records, and to set up each file so that the teacher will be able to alter the files in any way desired. The puzzles on the disk were also improved and the question/answer choices were randomized to provide greater use of the program for each student. The program was reviewed several times in-house and by outside consultants. Many "bugs" in the program needed to be worked out before it operated appropriately

The supplement, to accompany the original MECC manual and the talking version of Prefixes which includes talking versions of the original Prefixes print worksheets, was rewritten for the revised program. The word lists used in the Prefixes program were included in the supplement to be provided in large type and braille so that the blind students' activities would not be made more difficult by becoming a spelling problem in addition to the task presented. The supplement discussing the changes and new operational features of the program was reviewed and edited.

The final draft of Elementary Volume 5--Language Arts (Prefixes) was sent out for evaluation.

Following an in-house review of Social Studies Volume 1, it was decided that the program would not be useful to teachers unless background information for using each program on the disk was provided. A social studies teacher who worked on the original MECC version was contacted regarding writing the necessary background information for each unit and the student worksheets necessary to the unit. Mr. Loren Dunham provided suggestions for improving the current documentation by including an enhanced "Instructional Design Model." Mr. Dunham developed the necessary background information for one of the programs, USPOP, on the Social Studies Volume 1 disk as a prototype.

MECC was contacted regarding obtaining permission to adapt three more programs, Writing A Narrative, Oregon Trail, and Word Munchers. Permission to adapt these programs was never granted.

During FY 1990, field reviews of Elementary Volume 5--Language Arts (Prefixes) were received. Numerous suggested changes were made by the the consultants. Programming changes were made as recommended by both in-house and field reviewers. Some of the program's activities were reworked to simplify the language used and to reflect more modern age-appropriate questions. Instructions were altered to give precise information. The program was enhanced with a tone-playing algorithm and small musical selections were added to the tutorials associated with each of the lessons. To add appeal for the low vision users, simple pictures were created to show while making the transition from tutorials to the lesson program. An "Extensions Manual" which provides pre- and post-computer integration activities to supplement the talking version of Prefixes was written.

An in-house review of Prefixes indicated continued difficulties with the crossword puzzles and numerous small problems. The crossword puzzles were reworked for ease of use and speed in constructing the puzzles.

The background information on USPOP was received and reviewed by in-house staff. It was found to be quite excellent and more extensive than actually planned. Providing this same type of needed background material to accompany the ELECT series and POLICY program on the Social Studies Volume 1 disk was discussed and negotiated with Mr. Dunham. He agreed to provide the necessary materials to accompany the talking programs and original MECC manual.

The Seventh Microcomputer Advisory Committee recommended that APH discontinue all work on MECC programs. The committee felt that modifications of these programs did not meet relevant educational needs of blind students. APH staff decided that except for completing Prefixes and Social Studies Volume 1, no additional MECC programs will be modified unless specific selections are found that meet precisely defined educational needs of blind learners.

Work during FY 1991. As a result of in-house reviews, a final list of changes needed on the Prefixes program was developed and turned over for reprogramming and debugging the software. Drafts of the supplement and extension activities were completed and reviewed, but the documentation cannot be finalized until the software is in a near finished form.

The teacher who had worked as a consultant preparing the background material for the programs on the Social Studies Volume 1 disk was unable to continue due to other professional and personal responsibilities.

Work planned for FY 1992. Due to work on other higher priority projects, the final programming changes and debugging on the Prefixes software have not been done. These will be completed during this fiscal year. Once the software is in its final form, the documentation will be revised and completed. The program will be turned over for production during this fiscal year.

The partially modified Social Studies Volume 1 program will be reviewed and a decision will be made whether to drop the program or use what's been done so far and make the program available as is.

SEI Software (completed)

Purpose: To adapt educationally sound, commercially available software for use by visually impaired persons

Project staff: Debbie Willis, Project Director
Rob Meredith, Programmer
Larry Skutchan, Project Assistant
Venus Elder, Project Assistant

Background. At the Second Microcomputer Advisory Committee Meeting, a modified version of Sliwa Enterprises, Inc. (SEI) educational software series was given high priority. The content of each SEI program is appropriate for high school and college students as well as adults. APH was able to make an arrangement with SEI for a customized edition of 33 of these programs. SEI, however, retained manufacturing rights to these programs. Production approval for the series was received.

Before going to production, each disk was thoroughly checked for any factual or grammatical type errors; a camera-ready introductory page, title page, and reference guides were prepared to accompany the large type manual for each program. The same materials were also prepared for braille. SEI complied with APH request that an updated version of TEXTALKER be used on its disks to make the programs compatible with the Apple IIGS. Prior to FY 1989, 20 programs were turned over to production.

During FY 1989, adaptation was completed on the remaining 13 programs and they were submitted for production. Project staff worked with production personnel as needed on manufacturing the programs. All 33 APH/SEI talking software programs became available from APH during this fiscal year. Sales of the programs were monitored.

In order to better serve APH's customers by determining its own production schedule, APH negotiated manufacturing rights during FY 1990 for the 33 APH/SEI talking software programs modified especially for APH. Manufacturing rights and the 33 masters were received. The masters were spot-checked; several "bugs" were found and corrected. Duplicates for the Department of Educational and Technical Research, for production, and for Steve Sliwa were made. The masters were then stored for safe keeping.

Work during FY 1991. Sales of APH/SEI Talking Software have been good. The Micro Group has received a considerable number of comments and suggestions regarding the three programs (i.e., Vocabulary Builder, Word Analogy, and Sentence Completion) that make up the SAT series. The primary suggestions are that the speech on these be corrected and that pauses in the speech output be incorporated in appropriate places. These suggestions were discussed at the Eighth Microcomputer Advisory Committee Meeting. Because of other higher priorities, changes to these programs were given a low priority by the committee members.

In order to make the 33 APH/SEI talking software program work appropriately with the new Echo II speech synthesizer when used with an Apple IIGS in the fast mode, some reprogramming needed to be done during this fiscal year. The programs were then checked for problems that resulted from the programming modifications. New masters for the Department of Educational and Technical Research and the Production Department were made. While the programs were being revised, the manual was also being rewritten so that a generic manual could be produced. Once the current stock of SEI manuals is depleted, the new generic manual will be offered separately from the SEI talking software programs.

Work planned for FY 1992. Sales of the programs and suggestions for changes to the programs will continue to be monitored to determine the need for any further activity.

Speaqualizer (completed)

Purpose: To produce a speech synthesis system for IBMs

Project staff: Larry Skutchan, Systems Programmer
Jim Robinson, Manufacturing Specialist

Background. The Speaqualizer is a hardware based access package for the IBM computer. It permits the blind user to use speech to examine text displayed on the screen.

Speaqualizer was developed by the Research Committee of the National Federation of the Blind. After obtaining production approval from the Educational Research and Development Committee, APH research staff members began working with the National Federation of the Blind to continue development of the device's firmware. It became available from APH in July 1987. Since then, several enhancements have been introduced and offered to existing users as upgrade packages that provide the new features to existing Speaqualizers. These include features like the ability to completely silence the speech for use by sighted coworkers, improved cursor handling performance, and improvements with respect to use in word processing applications. In addition, the DIP switches on the board were used to provide configuration information and preferred startup parameters. The boards were also modified to work on the new, faster machines becoming available.

Work during FY 1991. Much preparation for the new Speaqualizer design was completed. This includes rewriting the code to make it easy to switch to the new display mapping and hardware I/O location recognition. (Recall that the new design permits Speaqualizer to capture the entire screen RAM of the host computer.)

Extensive evaluation was conducted into the feasibility of moving the environment from its Z-80 microprocessor design to the 8088 family of processors. This change would permit the programming team to use a variety of tools that are much more rich in the 8088 environment while allowing the system to evolve with that family of processors. Considerations along these lines were made early in Speaqualizer's development and enhancement phases, but, at that time, it was considered too much of a burden to convert the existing code to the target processor format. It has been determined that this work can be done in a matter of weeks and that the future benefits would be well worth the effort both in terms of compatibility, growth, and maintainability. Additionally, the new processor would help reduce the size and cost of the system if the DoubleTalk speech system is chosen.

Work on the speech component of Speaqualizer progressed, although not as quickly as expected. Tim Cramner made contact with Digital Equipment Corporation, the manufacturers of the Dec-Talk speech synthesizer, who had expressed an interest in working with a nonprofit organization. The negotiations, however, did not look too promising. If work with Digital Equipment Corporation fails, the original plan of using the DoubleTalk speech system will resume.

Work planned for FY 1992. The National Federation of the Blind estimates that it will have more resources to put into research and will take over much of the future development on Speaqualizer.

Talking Literacy Kit (TALK): Apple II Computers (continuing)

Purpose: To provide an introductory set of speech-accessible computer software and related materials for any of the current Apple II family of computers which could be easily integrated into existing programs of computer literacy or introduction to computers for legally blind youth through adult beginners

Project staff: Debbie Willis, Project Director
Rob Meredith, Programmer
Fred Otto, Project Assistant
Venus Elder, Project Assistant

Background. During the fall and winter of 1985, the Talking Apple Literacy Kit (TALK): //e Edition was in the production pipeline of APH. The product became available in September 1986. First run sales were most encouraging. Subsequent runs of the kit were initiated and sales remained brisk. In response to requests from the field, APH offered sets of the Brailled Keyboard model for the Apple //e, a component of the TALK, as a separate item. The name of the kit and other components were changed in 1987 in order to be in compliance with the legal guidelines of Apple Computer, Inc.

At the Fifth Microcomputer Advisory Committee Meeting, a revision of the kit to include all current Apple II computers received high priority. Work on two components of the revised kit, the Brailled Keyboard Overlay for the Apple IIGS(R), and the disk introducing the keyboard, word processing, and games was started.

Work on the disk was continued during FY 1989. The introductory word processing program, introductory games, and keyboard practice were programmed for speech and large print output to the screen. The program was named LetterTALK+. Documentation to accompany the disk was drafted. The program was reviewed in-house several times and underwent many changes.

Work on the Brailled Keyboard Overlay for the Apple IIGS also continued. Prototypes of the overlay were developed, checked for accuracy, tested for legibility, and a brief supplement to accompany the product was written. After some revisions, the materials were completed and turned over to production. It was decided to offer LetterTALK+ and the Braille Keyboard Overlay for the Apple IIGS as separate products from the kit. The overlays were produced and are being sold separately from the kit in packages of five.

During FY 1990, the draft of the documentation for LetterTALK+ was expanded to include "Extension Activities." Review of LetterTALK+ by in-house staff indicated problems related to the speed settings for the operation of the programs on the disk and several other major operational changes were needed. LetterTALK+ was used at the Kentucky School for the Blind during its summer enrichment program. Several problems were discovered as a result of the students' use of the program. An extensive list of changes was sent to the programmer.

The software disk entitled APH Presents the Talking Apple was reprogrammed to convert the modules over to ProDOS, to reorganize the source code for current editors in use, and to make the program recognize the wider variety of Apple II computers currently available. This program was updated to include features of the Apple IIGS, new features of TEXTALKER, and suggestions from the field.

Sections of the teacher's manual were updated and rewritten to include current information.

Work during FY 1991. After in-house review of LetterTALK+, an extensive list of changes was sent to the programmer early in the fiscal year. Due to personal time constraints, the programmer was unable to work on the necessary changes. A draft of the documentation to accompany LetterTALK+ was written, but cannot be finalized until the software is in its final stages of completion.

APH Presents the Talking Apple underwent programming changes to make it compatible for use with the Slotbuster and DoubleTALK. After these and several operational programming changes, APH Presents the Talking Apple received several in-house reviews. A draft of the updated and expanded teacher's manual was written; the final form it takes will depend on the final versions of the software and comments from reviewers.

Work planned for FY 1992. Because the original programmer of LetterTALK+ has been unable to work on the necessary revisions, another programmer will take over the task in FY 1992. After LetterTALK+ has been corrected and revised, it will again be reviewed by in-house staff. Final necessary changes will be made to the program disk. The documentation accompanying LetterTALK+ will be revised, edited, and a final draft prepared. Reference sheets to accompany the disk will be prepared. The final draft of the LetterTALK+ software program with accompanying documentation and reference sheets will be evaluated by outside consultants. After suggested modifications have been made, LetterTALK+ will have a final in-house review and then be prepared for production as a separate software program, independent of the Talking Literacy Kit.

APH Presents the Talking Apple will be reworked in light of the criticisms and suggestions made by the in-house reviewers during FY 1991. Once it has been reprogrammed, in-house reviews will again be done. Final changes to the software will be made and a final review will be done before including APH Presents the Talking Apple in the revised Talking Literacy Kit.

The remaining sections of the teacher's manual will be updated. The revised manual will then be recorded. The computer parts collection in the kit will also be reviewed and updated.

The entire revised kit will be evaluated by two consultants. After final revisions and a final in-house review, the Talking Literacy Kit for Apple II Computers will be turned over to production.

Talking Typer (completed)

Purpose: To provide students/clients and teachers with appropriate software and documentation for use in reinforcing typing skills with computers

Project staff: Debbie Willis, Project Codirector
Larry Skutchan, Project Codirector
Rob Meredith, Programmer
Fred Otto, Project Assistant

Background. At the Second Microcomputer Advisory Committee Meeting, a typing program called Kids Can! Typer, developed by Ted Hasselbring and Carol Hamlett for sighted special education students, was demonstrated and discussed. The advisory group gave a speech-adapted version of this program a high priority. APH acquired complete marketing rights to the speech-adapted version and contracted with Carol Hamlett to make the necessary programming changes. Production approval was requested and received for this product.

An initial version of the adapted program (teacher disk, student disk, and documentation) was completed. The three components were thoroughly reviewed by in-house staff and several major "bugs" were found. A review of the entire program with suggestions for changes was sent to Carol Hamlett. While initial plans had not included adding speech to the teacher disk, Miss Hamlett reprogrammed that disk to make all the essential information being presented to the screen talk. A revised version was sent to APH. A preliminary review indicated there were still too many problems in the program's operation to send it out for formal evaluation and the manual was difficult to follow. Therefore, more revisions were required.

During FY 1989, all known bugs were eliminated, several speech oriented enhancements (including complete speech support for the editor) were installed, and the documentation was revised. After numerous in-house reviews and changes, a final draft of the entire Talking Typer program was sent out for evaluation by consultants.

After being reviewed by outside consultants and undergoing repeated in-house examinations, the Talking Typer underwent numerous small changes during FY 1990. Some of these were in the nature of bug fixes, but most were aesthetic changes to enhance the usefulness and logic of the program. The manual was edited, revised for accuracy and thoroughness, and reorganized for understanding and ease of use. Camera-ready copy of the manual was prepared for production.

Informal meetings were held to discuss final packaging of the disks, the number of disks to include in 5 1/4" and 3.1/2" formats, and instructions for use and rights regarding copying of the disks. There was also discussion of the best features and settings to include as defaults with the program as shipped. Because of the complexity of placing innumerable options under control of the instructor via the Teacher's Disk, the total program was given repeated serious in-house reviews.

After all aspects of the Teacher's Disk, Student's Disk, and documentation were coordinated, accurate, and working appropriately, Talking Typer was prepared for production. APH staff decided that the program would be made available as Teacher's versions in 5 1/4" and 3 1/2" formats as well as supplemental Student disks in the same disk formats. The documentation included in the Teacher's versions would be provided in large type, on disk, and on cassette.

Work during FY 1991. The Educational and Technical Research staff worked with the Production Department in manufacturing the first run of Talking Typer. This program was produced in 3 1/2" and 5 1/4" versions, Student's and Teacher's Editions. It was priced and shipping began early in 1991. Sales have been excellent, particularly of the 5 1/4" versions.

Work planned for FY 1992. Talking Typer is complete. Changes to future versions will be dictated by responses from customers.

Telecommunications (continuing)

Purpose: To introduce blind students, clients, and teachers to telecommunications; what it is, its wide array of uses, how to communicate via modem with other computers, how to access national services and bulletin boards

Project staff: Microcomputer Group

Background. At the Fifth and Sixth Microcomputer Advisory Committee Meetings the need for materials to introduce students and teachers to telecommunications was expressed. "Networking," "telecommunications," and "distance learning" had quickly become projects of great importance in the schools.

The Microcomputer Group found bulletin board simulations and tutorials on the subject. In addition, the group observed classes on the subject.

Research in the area indicated that speech output for existing telecommunication training materials would meet the needs of blind students. Therefore, with the approval of the Seventh Microcomputer Advisory Committee, it was decided that the best approach to this topic would be a series of articles in the Micro Materials Update. The first of the series appeared in the Winter 1990 issue.

Work during FY 1991. The second and third in a series of articles regarding telecommunications was written and published in the Fall 1990 and Spring 1991 Micro Materials Update.

The Eighth Microcomputer Advisory Committee recommended that the Micro Group disseminate information on Kermit availability. The committee further requested that the Micro Group look into adapting a telecommunications simulation program and include this information in a future Micro Materials Update telecommunications article.

Work planned for FY 1992. The recommendations of the Eighth Microcomputer Advisory Committee will be investigated and reported. This and additional information on telecommunications will continue to be disseminated through the Micro Materials Update as long as there is a need for such.

TEXTALKER (completed)

Purpose: To incorporate features specifically recommended by blind users into the TEXTALKER software and to set standards for use of speech synthesis on the Apple II

Project Staff: Larry Skutchan, Systems Programmer
Rob Meredith, Programmer

Background. TEXTALKER is the software that works with the Echo synthesizers to provide the Apple with synthesized speech. It was written by Street Electronics Corporation. Members at the Third Microcomputer Advisory Committee Meeting recommended the program be modified to more accurately reflect the needs of the blind user and to help set standards for talking software. The research staff gathered information from several sources including a survey conducted by Bob Glass, the suggestion files at Street Electronics, comments from end users, and observations of users in the field. With the cooperation of Street Electronics, several improvements were added to the system that both enhanced productivity and increased ease of use. One of these features, the ability to silence any text with any keystroke, has become a standard not only on the Apple, but in many IBM screen access packages. (APH's Speaqualizer supports this feature.) APH's initial version of TEXTALKER was released as version 3.1.1. Later, with the introduction of the Apple IIGS, TEXTALKER received changes that permitted it to function at the new computer's higher processing speeds. This and enhancements that enabled the user to define columns for reviewing purposes were installed and the program was released as version 3.1.2.

Work during FY 1991. Several significant changes were made to both versions of TEXTALKER. Many of these were prompted by the change in speech synthesizer chips when Texas Instrument Company dropped the 5220. Routines were written to determine the speech chip used in any member of the Echo family and adjust the timing accordingly.

Several minor problems were corrected and several parts of the code were optimized. Some new features and commands were also added to Textalker-gs. One new feature added to Textalker-gs lets the user be notified of words that contain capital letters interactively. Previously, to identify capitalized words, it was necessary to go into review and examine the word in question on a character-by-character basis. Another was the addition of two undocumented commands to let the technical team provide field support for specialized situations were a machine runs at faster speeds than the programming team has tested.

Typing Program (new)

Purpose: To provide students/clients and teachers with appropriate software and documentation for use in teaching/reinforcing typing skills using IBM and compatible computers with speech output capabilities

Project staff: Larry Skutchan, Project Codirector
Debbie Willis, Project Codirector
Rob Meredith, Programmer
Venus Elder, Project Assistant
Fred Otto, Project Assistant

Background. As recommended by several Microcomputer Advisory Committees, the nontalking Kids Can! Typer was adapted by the Micro Group for complete speech accessibility. The talking version, Talking Typer, for use on Apple II computers became available from APH in January 1991.

Work during FY 1991. The members of the Eighth Microcomputer Advisory Committee gave a high priority to developing a typing program similar to Talking Typer for use on IBM and compatible computers. They recommended that an additional teaching component with information on correct posture and fingers to use to type particular characters be included.

Work planned for FY 1992. The Micro Group will begin investigating commercial programs and alternative solutions to the above need. (See write-up on Eighth Microcomputer Advisory Meeting for additional information regarding the possible development of a talking typing program for use with IBM and compatible computers.)

The World Book Encyclopedia, Disk or CD-ROM Edition (discontinued)

Purpose: To provide a special edition of The World Book Encyclopedia which would be accessed via technology

Project staff: Larry Skutchan, Project Director

Background. APH has produced two special editions of The World Book Encyclopedia. The first was a braille edition of the 1959 reference work and the second was a recorded edition based on the 1978 and 1979 editions. Updated information was provided for the latter through provision of three supplements; The World Book Year Books for 1980 and 1981, 1982 and 1983, and 1984 and 1985. Due to the age of the main reference work, a decision was made not to produce any subsequent combined yearbooks. However, visually impaired students need access to a major reference work such as this encyclopedia, which is the most widely used encyclopedia for educational purposes.

APH met with World Book personnel and learned that World Book was still interested in working with APH and that the text was available in electronic form.

Investigation continued into the feasibility of developing retrieval software to run on the Apple II line of computers. It was determined that APH could produce retrieval software that runs on the Apple IIGS with relatively little difficulty that could actually use the text as it already exists on the IBM format disk. In addition, APH can reformat the text into a CD ROM in the Apple ProDOS format that could be used by all Apple II computers with at least 128K of RAM.

Work during FY 1991. Since the inception of this project, World Book, Inc. has released a CD-ROM version of World Book encyclopedia. This means that it is not necessary for APH to pursue this project any further.

Work planned for FY 1992. Since the Eighth Microcomputer Advisory Committee recommended that this project be dropped, no further work is planned.

Other Activities

Analysis of the 1990 Registration Data (completed)

Purpose: To describe the legally blind population registered through APH

Project staff: Karen Poppe, Project Director

Background. Each year information concerning legally blind students in the nation is reported to the American Printing House for the Blind in order to register eligible students for federal quota funds. Periodically, these data are examined to discern trends within the population and general characteristics of students requiring materials and services. The most recent of these analyses is reported in Distribution of Quota Registrants in 1987: Grade Placement, Visual Acuity, Reading Medium, School of Agency Type, and Age that was prepared by Suzette Wright.

Work during FY 1991. During the latter part of 1987, a lengthy program was developed for the new computer system installed for management of the annual registration. This same menu-driven program was used to generate the needed information for the analysis of the 1990 registration data. Provided were the numbers of students reported in each school/agency type (4 categories), grade placement (20 categories), reading medium category (5 categories), and visual acuity category (9 categories); the average age of students was also calculated. The computer program provided, in tabular form, the combined analyses of these variables, thus showing the distribution of students by one, two, or three defining factors. A total of 19 tables were generated based upon the 1990 registration data. Some data were modified for the purpose of the analysis; omission of a student from the total population was warranted if (a), the student was reported by the Hadley School for the Blind; (b) if a student was reported with a visual acuity in category X (field restriction) in one or both eyes or (c) if a student with a "better eye" category of VIII (light projection or perception) or IX (totally blind) was reported using a visual reading medium. A total of 2,328 students were deleted from the original population of legally blind students; consequently, the analysis of the 1990 registration data was based upon 45,743 students--95.2% of the total number registered. Additional attention was given to comparing the information examined in this study to the 1987 registration data; such an inter-study comparison was not possible in 1987 due to many irregularities found in how data were reported to APH during that year and the previous years. Categories of information requested are now more clearly defined and mutually exclusive.

A formal and detailed report describing the demographics of the current population of legally blind students and developing trends was prepared and completed in March 1991. This analysis of the 1990 registration is available upon request from the Department of Educational and Technical Research.

Hand-held Scientific Calculator (new)

Purpose: To provide a talking hand-held scientific calculator with a large print display for use by legally blind high school students and adults

Project staff: to be determined

Background. At the Seventh Microcomputer Advisory Committee Meeting, the participants gave a high priority to the adaptation/development of a talking hand-held scientific calculator.

Work during FY 1991. At the Eighth Microcomputer Advisory Committee Meeting, the participants reported that a talking hand-held scientific calculator with a large print display and an earphone jack is desperately needed for students in grades 10 and above.

Work planned for FY 1992. APH will explore the possibility of providing a talking hand-held scientific calculator that has a large print display.

Surveys of Ex Officio Trustees (series)

Purposes: To obtain information for APH (a) regarding needs for materials and (b) for administrative purposes

Project staff: June Morris, Project Director
Karen Poppe, Project Assistant

Background. Periodically, ex officio trustees have been queried about timely topics (e.g., specific textbook needs, specific needs for special teaching materials, preferred days for Annual Meetings, resources for purchasing educational materials, information on minimum competency testing in their states/agencies, etc.).

Work during FY 1991. No surveys were undertaken during this period.

Work planned for FY 1992. It is probable that a survey will be conducted in the spring of 1992 similar to those conducted in the springs of 1989 and 1990 regarding APH's products and services.

Tools for Selecting Appropriate Learning Media (new)

Purpose: To expand the assessment section (Section II) of the document entitled Print and Braille Literacy: Selecting Appropriate Learning Media which was developed at the American Printing House for the Blind by a group of experts in the areas of print and braille literacy

Project staff: Hilda Caton, Project Director
Eleanor Pester, Project Codirector

Background. On June 8-9, 1990, a committee of experts in the field of education of visually impaired children met at APH to develop a set of guidelines to assist teachers of visually impaired students in selecting the appropriate learning media/medium for their students. The resulting document is entitled Print and Braille Literacy: Selecting Appropriate Learning Media and is published by APH. This document does not contain specific, detailed assessment procedures. Instead, it contains general guidelines to assist teachers and other professionals in making decisions about learning media. Members of the committee who developed the guidelines felt that it was necessary to expand them and to develop specific assessment procedures for determining the appropriate learning media/medium for individual students. In order to accomplish this, a planning committee was formed to draw up specifications for this project.

Work during FY 1992. This committee met at APH on August 26-27, 1991, to address such questions as: (1) what information is needed in order to make valid decisions about students' learning media/medium. (b) what is already available to assist in this process, (c) what is not available, and (d) what assessment instruments (if any) are needed to develop or adapt for this purpose. This is not an exhaustive list of questions addressed, but it reflects the general purpose of the project. The meeting resulted in the outlining of an expanded version of Section II of Print and Braille Literacy which will include specific assessment procedures and instruments for each part of that section. Members of the planning committee will assist in the writing of these sections and additional members will be added to the committee as needed. The writing of the first draft of these sections will be completed in November, 1991. These drafts will be edited and revised and a first draft of the complete document completed by May 31, 1992. This will be sent to the committee for review in June 1992. Committee members are:

Sr. Margaret Fleming, Teacher, St. Lucy's Day School, Philadelphia, Pennsylvania
Mrs. Ruth Holmes, Retired Low Vision Specialist, Illinois School for the Visually Impaired and the State of Illinois, Jacksonville, Illinois
Mr. Fred Schroeder, Director, New Mexico Commission for the Blind, Santa Fe, New Mexico
Dr. Susan Spungin, Associate Executive Director, American Foundation for the Blind, New York, New York
Dr. Robert Winn, President, The Hadley School for the Blind, Winnetka, Illinois
Dr. Diane Wormsley, Director of the Western Regional Center, American Foundation for the Blind, San Francisco, California

Technical Research Division

Technical Research Division

Purpose: To develop products involving technology and to introduce other new products for production

Division staff: Bob Phelps, Manager
James Robinson, Manufacturing Specialist
Frank Hayden, Manufacturing Specialist
Darlene Donhoff, Technical/Clerical Assistant

Background. For many years APH personnel from its research and new products departments worked closely together in the development of electronic and other technological products and in the process of transforming experimental prototypes of new products into manufactured goods. Because of this close relationship, in January 1989 an organizational change was made in which the New Products Department became the Technical Research Division of the Department of Educational and Technical Research (previously the Department of Educational Research).

Work during FY 1991. Every new product initiated by Educational Research staff or by other areas of APH requires a bill of materials be estimated, vendors be located, raw materials be priced, raw materials numbers be constructed, work orders be assigned, lead times for manufacturing be calculated, and other associated production tasks be done. Some require artwork for new tooling processes. When revisions are made, old stock is pulled and replaced with new. These constitute the daily nuts and bolts of the Technical Research Division operations; in addition, the following briefly describes specific projects addressed by this division:

AC/DC Rechargeable 4-Track Cassette Tape Recorder/Player--Redesign. A prototype mock-up sample was received from Thompson Consumer Electronics for evaluation purposes. It was thoroughly examined by everyone concerned and all problems and/or suggestions documented and given to Thompson. In late June a sample off the actual production line was received. A few minor problems were identified and reviewed with Carl Friedline of Thompson Consumer Electronics who indicated all problems would be corrected.

APH Multiple Headset Adaptor. This product was redesigned to use a mini jack and plug, now in common use, instead of the 1/4-inch jack and plug previously used. This change necessitated the redesign of the case. The updated product was completed and stocked in February 1991.

APH PocketBraille. A repair manual for this product was under development during the year. Initially, repairs of products involving technology are the responsibility of the Division, which is also responsible for writing repair manuals. Information obtained actually making repairs is incorporated in the manuals. At the time a manual is completed, it is turned over to APH's Electronic Repair Department which assumes responsibility for repairing the product at the time.

APH Portable Plus. The Division implements the first production run of most of APH's new educational aids and tools. The initial run of 200 units of this device was completed. Related tasks included completing work orders (paperwork), making revisions to the production manual which is used in subsequent production runs, modifying over 300 of 500 circuit boards used with this product, repairing units returned for malfunction, and developing a repair manual.

Bright Sights Kit(s). A problem with the paint chipping off the painted wooden blocks in this kit was corrected. Working with Glen Spencer, of Spencer Machine and Tool Company, and Tom Poppe, the blocks were redesigned with a waffle-like design to be injection-molded out of colored plastics. This eliminated the need to paint and provides a more durable end product.

Circuit Board Room. APH has a goal of doing as much work as possible in-house as this provides greater control over its production schedule. To address this, a room was set up and equipped to enable the Division to make prototype circuit boards rather than having to send them out to vendors. All procedures were tested and proven to be effective.

Classroom Calendar Kit. Written documentation for this new product was received from Educational Research in March 1991. Subsequently, drawings were made for a new shipping carton and for dies to be used in cutting out parts. Additionally, the artwork needed for the required silk-screens was completed.

Digital Audio Project. Previously, APH developed a technique for archiving recorded masters under a contract with the National Library Services. This work was done in the Technical Research Division. This year the Division responded to a request from the Library to archive 49 tracks. Subsequently, a request was received requesting the archiving of 30 APH titles (183 tracks) and 6 Denver titles (48 tracks). In order to meet the required completion date, the digital equipment was moved to APH's mastering area and Division staff taught mastering employees how to use the equipment to archive the recorded material.

Echo Commander. This product, which was an adaptation of a commercial product, was discontinued when the product upon which it was based was discontinued. The Division assembled a final production run of the product to fill back orders. Subsequently, notices were sent notifying customers the Echo Commander was no longer available but had been replaced with other products.

Echo II. This product replaced the Echo Commander. It is packaged with TEXTALKER or Textalker--gs. The Division provided for 500 units of the new product; 250 of each type. The repair manual for the new product was completed and turned over to APH's Electronic Repair Department.

Expanded Dolch Word Cards. A problem was discovered with this product's storage box. The box, which was not assembled was packed flat in an envelope with the word cards. During shipment, the box was found to break apart. Working with Ken Flaherty, of Stone Containers, changes were made in the design of the box which corrected the problem.

Flicker Light. In the past, this product has required three labels. One was used if the light was sold as a separate unit, another if it was sold as a component of the Bright Sights Kit, and a third caution label used in either case. The caution label is necessary to warn users of the possibility the flickering light could cause seizures in seizure-prone persons. One label was designed incorporating all necessary information. It will replace the three labels previously used.

On the Way to Literacy: Early Experiences for Young Visually Impaired Children. This product includes 10 tactile/visual storybooks. Considerable time has been spent determining the materials to be used in the production of these books. At the same time, the most efficient production processes for the manufacturing of these books have been determined as procedures quite different from the normal are required. These have been documented in an extensive production manual for this product.

Portable Sound Source II. The Division facilitated a change in the process by which this product is manufactured. A new circuit board vendor was identified who will attach the related wiring and the parts attached to the wires, providing for easier assembly at APH.

Revised Parts Lists. The Division has been responsible for revising existing parts lists for APH's educational aids. One of the changes made is the listing of parts numbers with those individual items in kits that can be purchased separately. This will eliminate the problem customers have being able to correctly identify replacement items or additional parts needed. Approximately 40 parts lists were revised and approved during the year.

Sensory Pad. The sensory pad is a new product which can be used to stimulate movement. Work on it was initiated some years ago but was tabled due to failure to find a cost-effective way to manufacture the product. Advances in technology have given promise of overcoming this problem. A prototype circuit board has been designed that incorporates the functions envisioned for this product.

Silk-Screening. Silk-screening is a process used in the manufacture of many of APH's products. Traditionally, some of the work has been done in-house and some has been jobbed out. The Division was given the opportunity of evaluating APH's silk-screening capability, again with a goal of determining how it might be enhanced to enable more work to be done in-house for greater control over production schedules. Progress has been made in that ventilation problems have been addressed and adjustments made to everyone's satisfaction regarding worker safety, and over 100 new screens have been made for use with the automatic silk-screen press. Three employees who volunteered to work in the area were trained and screening was completed for production runs of Light Box Materials: Levels I, II, and III; Clock Face with Raised Print and Braille Numbers; over 2,000 software binders; Seated Parquetry, Fine Motor Development Materials: Twist, Turn, and Learn; and the Bright Sights Kit. Time required to silk-screen products has been greatly reduced and the rejection rate reduced to less that 1%.

Speaqualizer. The repair manual for this product was completed and turned over to the Electronic Repair Department enabling it to repair products returned for servicing.

Variable Intensity Study Lamp. Division personnel worked with Tom Poppe to redesign the base of the lamp for the dual purposes of eliminating the need to modify the dimmer switch and to enhance the appearance of the product.

Work Planned for FY 1992. In addition to continuing to work on the development of new products, implementing first production runs of new educational aids and tools, and finding solutions for other departments when problems arise, definite plans are in place for the following:

Hands On: Functional Activities for Visually Impaired Children--implement first production run

On the Way to Literacy: Early Experiences for Visually Impaired Children--implement first production run

APH Multiple Headset Adaptor--further redesign to facilitate use

APH PocketBraille--complete development of repair manual

APH Portable Plus--complete development of repair manual

Parts list--continue revising as products for which new parts lists have not been made are scheduled for production

Agencies Participating in Research

In addition to the agencies named here, appreciation is also extended to the many other agencies which cooperated with APH's research efforts by permitting members of their staffs to serve as consultants or respondents to requests for information.

Alabama School for the Blind; Talladega, Alabama
Alliance for Technology Access; Albany, California (formerly National Special Education Alliance; Cupertino, California)
American Council of the Blind; Washington, DC
American Foundation for the Blind, National Technology Center; New York, New York
Anchor Center for Blind Children; Denver, Colorado
Apple Computer, Inc.; Cupertino, California
BEGIN (Babies Early Growth Intervention Network); Center for the Visually Impaired, Atlanta, Georgia
Broderbund Software; San Rafael, California
Bucks County Intermediate Unit; Doylestown, Pennsylvania
California School for the Blind; Fremont, California
Capitol Area Intermediate Unit; Camp Hill, Pennsylvania
Carr School; Lincoln Park, Michigan
Claris Corporation; Mountain View, California
Colorado School for the Deaf and the Blind; Colorado Springs, Colorado
Coyle Avenue School; Carmichael, California
Dallas Services for Visually Impaired Children; Dallas, Texas
DeKalb County Schools; DeKalb, Georgia
Disabled Citizens Computer Center; Louisville, Kentucky
FOCUS Media Software, Inc.; Garden City, New York
Foundation for Blind Children; Scottsdale, Arizona
The Governor Morehead Preschool Program; Greensboro, North Carolina
The Governor Morehead Preschool Program; Raleigh, North Carolina
Indiana Department of Human Services; Indianapolis, Indiana
Indiana School for the Blind; Indianapolis, Indiana
International Business Machines Corporation; Louisville, Kentucky
International Business Machines National Support Center for Persons with Disabilities; Atlanta, Georgia
Jefferson County Public Schools; Louisville, Kentucky
Kentucky Department for the Blind; Frankfort, Kentucky
Kentucky School for the Blind; Louisville, Kentucky
Kenwood Montessori School; Louisville, Kentucky
Maryland School for the Blind; Baltimore, Maryland
Mid-State Instructional Support Center; Harrisburg, Pennsylvania
Mindplay Software; Tucson, Arizona
Minnesota Educational Computing Corporation (MECC); St. Paul, Minnesota
National Federation of the Blind; Baltimore, Maryland
National Federation of the Blind, Research and Development; Frankfort, Kentucky
New Mexico Commission for the Blind; Santa Fe, New Mexico
New Mexico Preschool Program; Albuquerque, New Mexico

New Mexico School for the Visually Handicapped; Alamogordo, New Mexico
New York Association for the Blind (The Lighthouse); New York, New York
North Carolina Division Services for the Blind; Raleigh, North Carolina
Ohio State University; Columbus, Ohio
Overbrook Educational Center; Philadelphia, Pennsylvania
Overbrook School for the Blind; Philadelphia, Pennsylvania
Perkins School for the Blind; Watertown, Massachusetts
Pinellas County Schools; St. Petersburg, Florida
Price Elementary School; Louisville, Kentucky
RC Systems; Bothell, Washington
St. Lucy's Day School; Philadelphia, Pennsylvania
San Francisco State University; San Francisco, California
Sensible Software; Troy, Michigan
Sliwa Enterprises, Incorporated; Woodland, California
Street Electronics Corporation; Santa Barbara, California
Teacher's College, Columbia University; New York, New York
Tennessee School for the Blind; Nashville, Tennessee
Texas School for the Blind and Visually Impaired; Austin, Texas
University of Louisville, Perceptual Alternatives Lab; Louisville, Kentucky
Utah School for the Blind; Ogden, Utah
Valle Verde Elementary School; Walnut Creek, California
Vision Software; Lexington, Kentucky
Visually Impaired Preschool Services; Louisville, Kentucky

Consultants

In addition to the consultants formally acknowledged in this section, appreciation is extended to the many individuals who have willingly given of their time and expertise in cooperating with the various research and development projects underway by responding to questionnaires, by answering less formal queries for information, and by working with research staff in countless ways such as: (a) identifying particularly talented teachers and other professionals to serve on committees and/or as expert reviewers; (b) recommending programs, teachers, and students appropriate for field evaluation sites; and (c) facilitating field evaluation efforts. Only through the splendid and continuing support of professionals working in the field and the people they serve is APH able to maintain its highly effective research and development program.

Assessment of Braille Skills

Dr. Sharon Bradley-Johnson, Professor of School Psychology, Central Michigan University, Mt. Pleasant, Michigan

Dr. Patricia Bussen, Associate Professor, Department of Rehabilitation, University of Arkansas, Little Rock, Arkansas

Ms. Shirley Harris, Psychologist, Michigan School for the Blind, Lansing, Michigan

Mrs. Sue Kupchunas, Teacher, Florida School for the Blind, St. Augustine, Florida

Dr. Roseann Reid, retired former Chairman Education Department, The Greater Pittsburgh Guild for the Blind, Presto, Pennsylvania

Braille Language Program

Teacher Evaluators

Mr. Mickey Abercrombie, Functional Reading Teacher, Colorado School for the Deaf and Blind, Colorado Springs, Colorado

Ms. Bridget Bassett, Primary Teacher of the Visually Impaired, Overbrook Educational Center, Philadelphia, Pennsylvania

Sister M. Margaret Fleming, Teacher of the Visually Impaired, St. Lucy's Day School, Philadelphia, Pennsylvania

Mr. Ted Lennox, Teacher of the Visually Impaired, Carr School, Lincoln Park, Michigan

Ms. Susan Mangis, Teacher of the Visually Impaired, Coyle Avenue School, Carmichael, California

Ms. Deborah Mason, Primary Teacher of the Visually Impaired, Overbrook Educational Center, Philadelphia, Pennsylvania

Ms. Carla McMillin, Teacher, Kentucky School for the Blind, Louisville, Kentucky

Ms. Joan Mehlman, Teacher, Tennessee School for the Blind, Nashville, Tennessee

Ms. Marion Morrison, Teacher, Kentucky School for the Blind, Louisville, Kentucky

Ms. Collett Perry, Teacher of the Visually Impaired, Valle Verde Elementary School, Walnut Creek, California

Ms. Karen Wood, Functional Reading Teacher, Colorado School for the Deaf and the Blind, Colorado Springs, Colorado

Braille Needs Meeting

Mr. Charles B. Boyer, Superintendent, California School for the Blind, Fremont, California

Ms. Lenore Dillon, Director of Itinerant Rehabilitation Teaching Program, Indiana Department of Human Services, Indianapolis, Indiana

Sr. M. Margaret Fleming, Teacher of the Visually Impaired, St. Lucy's Day School, Philadelphia, Pennsylvania

Ms. Angela Pratt, Executive Director, The Wichita Council for the Preschool Blind, Wichita, Kansas

Mr. Fred Schroeder, Director, New Mexico Commission for the Blind, Santa Fe, New Mexico

Ms. Anna M. Swenson, Teacher of the Visually Impaired, Fairfax County Public Schools, Falls Church, Virginia

Dr. Marjorie E. Ward, Professor, Department of Educational Services and Research, Ohio State University, Columbus, Ohio

Classroom Calendar Project

Ms. Patty Dilg, Teacher, Kentucky School for the Blind, Louisville, Kentucky

Development of Guidelines for Literacy: Selecting Appropriate Media

Mr. Norman Anderson, Teacher, Maryland School for the Blind, Baltimore, Maryland

Dr. Natalie Barraga, Professor Emeritus, University of Texas, Austin, Texas

Mr. Charles B. Boyer, Superintendent, California School for the Blind, Fremont, California

Mr. John di Francesco, President, Braille Revival League, American Council of the Blind, Oakland, California

Sr. M. Margaret Fleming, Teacher of the Visually Impaired, St. Lucy's Day School, Philadelphia, Pennsylvania

Dr. Randall Jose, Optometrist, Tulsa, Oklahoma

Dr. Sally S. Mangold, Professor, San Francisco State University, San Francisco, California

Mrs. Suzi McDonald Newbold, Preschool Teacher, Arizona School for the Deaf and Blind and the Foundation for Blind Children, Scottsdale, Arizona

Dr. Evelyn Rex, Professor, Illinois State University, Normal, Illinois

Mr. Fred Schroeder, Director, New Mexico Commission for the Blind, Santa Fe, New Mexico

Dr. Susan Spungin, Associate Executive Director, American Foundation for the Blind, New York, New York

Early Childhood Microcomputer Applications

Mr. Jim Allen, Computer Specialist, Texas School for the Blind, Austin, Texas

Mrs. Linda Clarke, Mentor Teacher, Los Angeles Unified Schools, Los Angeles, California

Sr. M. Margaret Fleming, Teacher of the Visually Impaired, St. Lucy's Day School, Philadelphia, Pennsylvania

Educational Research and Development Committee

Dr. Michael J. Bina, Superintendent, Indiana School for the Blind, Indianapolis, Indiana

Mrs. Barbara N. Bowman, Director, Instructional Materials Resource Center, Richmond, Virginia

Mr. Charles B. Boyer, Superintendent, California School for the Blind, Fremont, California

Ms. Suzanne G. Swaffield, Consultant, Visually Handicapped, South Carolina Department of Education, Columbia, South Carolina

Mr. John D. Watson, Director, Special Education Materials Clearinghouse and Depository, Tacoma, Washington

Dr. Richard L. Welsh, Executive Director, The Greater Pittsburgh Guild for the Blind, Bridgeville, Pennsylvania

Dr. Robert J. Winn, President, The Hadley School for the Blind, Winnetka, Illinois

Infant Skills Project

Teacher Evaluators

Mrs. Melinda Adkins, Teacher, Visually Impaired Preschool Services, Louisville, Kentucky

Ms. Debbie Alvarado, Teacher, Dallas Services for Visually Impaired Children, Dallas, Texas

Mrs. Sharon Bensinger, Director, Visually Impaired Preschool Services, Louisville, Kentucky

Mrs. Phyllis Cole, Supervisor, DeKalb County Schools, DeKalb, Georgia

Ms. Carol Danielson, Supervisor, Dallas Services for Visually Impaired Children, Dallas, Texas

Ms. Anne McComiskey, Director, BEGIN Program Center for the Visually Impaired, Atlanta, Georgia

Ms. Tammy Shirley, Occupational Therapist, Dallas Services for Visually Impaired Children, Dallas, Texas

Mrs. Charlie Sirman, Teacher, Visually Impaired Orthopedically Handicapped Classes, DeKalb County Schools, DeKalb, Georgia

Ms. Suze Stagus, Teacher, Visually Impaired Preschool Services, Louisville, Kentucky

Microcomputer Applications

Mr. Jim Allan, Data Services Specialist, Texas School for the Blind and Visually Impaired, Austin, Texas

Ms. Patty Barker, Technology Interface Specialist, Division of Services for the Blind, Raleigh, North Carolina

Dr. Michael J. Bina, Supteintendent, Indiana School for the Blind, Indianapolis, Indiana

Ms. Linda Bishop, Doctoral Student, Vanderbilt University/Peabody College, Nashville, Tennessee

Ms. Judy Bliss, President, Mindplay Software, Tucson, Arizona

Mr. Randy Carlstrom, President, RC Systems, Inc., Bothell, Washington

Dr. Tim Cranmer, Director, Research and Development, National Federation of the Blind, Frankfort, Kentucky

Dr. Emerson Foulke, Director, Perceptual Alternatives Lab, University of Louisville, Louisville, Kentucky

Ms. Carol Hamlett, Systems Programmer, Expert Systems Software, Inc., Nashville, Tennessee

Mr. Chuck Hartley, President, Sensible Software, Troy, Michigan

Mr. Frank Irzyk, Resource/Media Specialist, Central Pennsylvania Special Education Resource Center, Harrisburg, Pennsylvania

Mr. Marty Larson, Research Analyst, Minnesota Educational Computing Corporation, St. Psul, Minnesota

Mr. Dave Lyons, Programmer, Apple Computer, Inc. and DAL Systems, Cupertino, California

Ms. Harleen Powers, Computer Teacher, Florida School for the Deaf and the Blind, St. Augustine, Florida

Dr. Sandy Ruconich, Computer Specialist, Kentucky School for the Blind, Louisville, Kentucky

Dr. Steve Sliwa, President, Sliwa Enterprises, Inc., Woodland, California

Dr. Milo Street, President, Street Electronics Corporation, Carpinteria, California

Dr. Steve Sliwa, President, Sliwa Enterprises, Inc., Woodland, California

Dr. Milo Street, President, Street Electronics Corporation, Carpinteria, California

Mr. Wayne Thompson, Engineer, Kentucky Department for the Blind, Frankfort, Kentucky

Ms. Linda Unger, Vice-President of Product Development, FOCUS Media Software, Inc,, Garden City, New York

Ms. Cindy Young, Systems Engineer, International Business Machines Corporation, Louisville, Kentucky

Multihandicapped Adolescent Project

Mrs. Jackie Brennen, Supervisor of Life Skills Program, Overbrook School for the Blind, Philadelphia, Pennsylvania

Ms. Mary Jane Brown, Program Administrator, Multihandicapped Program, New York Institute for Special Education, New York, New York

Mrs. Diane Haynes, Early Childhood Teacher, Deaf-Blind Intervention Project, Lexington, Kentucky

Dr. Bernadette Kappen, Associate Director, Overbrook School for the Blind, Philadelphia, Pennsylvania

Ms. Donna Karlson, Vocational Teacher, New York Institute for Special Education, New York, New York

Ms. Martha Majors, Assistant Supervisor, Deaf-Blind Program, Perkins School for the Blind, Watertown, Massachusetts

Ms. Betsy McGinnity, Coordinator of Vocational and Transitional Services, Perkins School for the Blind, Watertown, Massachusetts

Mrs. Marie Ruf, Transition Teacher, Deaf-Blind Intervention Project, Lexington, Kentucky

Mrs. Mary Zatta, Teacher, Deaf-Blind Program, Perkins School for the Blind, Watertown, Massachusetts

New Educational Measures Identification

Dr. Sharon Bradley-Johnson, Professor of School Psychology, Central Michigan University, Mt. Pleasant, Michigan

Dr. Joan B. Chase, Associate Professor, UMDNJ--Robert Wood Johnson Medical School, Piscataway, New Jersey

Ms. Shirley Harris, Psychologist, Michigan School for the Blind, Lansing, Michigan

Ms. Suzanne G. Swaffield, Consultant, Visually Handicapped, South Carolina Department of Education, Columbia, South Carolina

Parent Early Childhood Education Series

Dr. Natalie Barraga, Professor (Emeritus), University of Texas, Austin, Texas

Dr. Vivian Correa, Professor, University of Florida, Gainesville, Florida

Dr. Verna Hart, Professor, University of Pittsburgh, Pittsburgh, Pennsylvania

Dr. Bernadette Kappen, Associate Director, Overbrook School for the Blind, Philadelphia, Pennsylvania

Parents and Visually Impaired Infants (PAVII)

Ms. Gail Cavello, Home Counselor, Blind Babies Foundation, San Francisco, California

Dr. Deborah Chen, Director of Special Education, Foundation for the Junior Blind, Los Angeles, California

Mrs. Amy Hosa, Parent, San Francisco, California

Dr. Claire Taylor Friedman, Infant Specialist, Contra Costa County, San Francisco, California

Preschool Learning Activities

Mrs. Jenny Guilda, Director, Kenwood Montessori School, Louisville, Kentucky

Mrs. Katherine Robinson, Teacher/Director, Montessori Program, Coleridge-Taylor Elementary School, Jefferson County Public Schools, Louisville, Kentucky

Teacher Evaluators

Ms. Melinda Atkins, Teacher, Visually Impaired Preschool Services, Louisville, Kentucky

Ms. Debbie Alvarado, Teacher, Dallas Service for Visually Impaired Children, Dallas, Texas

Ms. Sandy Bryant, Teacher, Preschool Service for the Visually Impaired, North Carolina Division Services for the Blind, Raleigh, North Carolina

Ms. Martha Chambers, Teacher, New Mexico School for the Visually Handicapped Preschool, Albuquerque, New Mexico

Mrs. Phyllis Cole, Vision Supervisor, DeKalb County Schools, Atlanta, Georgia

Ms. Patti Dilg, Teacher, Kentucky School for the Blind, Louisville, Kentucky

Mrs. Lenore Donelson, Supervisor, Dallas Services for Visually Impaired Children, Dallas, Texas

Dr. Sally Dietz, Supervisor, Lighthouse for the Blind, New York, New York

Mrs. Betty Dominguez, Supervisor/Director, New Mexico Preschool Program for Blind Children, Albuquerque, New Mexico

Mrs. Pauletta Feldman, Parent, Louisville, Kentucky

Ms. Julie Founder, Teacher, Alabama School for the Blind, Talladega, Alabama

Ms. J. Greeley, Teacher, Anchor Center for Blind Children, Denver, Colorado

Ms. Sandra Handy, Teacher, Utah School for the Blind, Ogden, Utah

Ms. Barbara Hatfield, Teacher, Utah School for the Blind, Ogden, Utah

Mrs. Debbie Hatton, Director, Preschool Services for the Visually Impaired, Raleigh, North Carolina

Ms. Judy Hayes, Teacher, Alabama School for the Blind, Talladega, Alabama

Mrs. Diane Haynes, Teacher, Deaf Blind Intervention Program, Lexington, Kentucky

Ms. Jeanette Jacobs, Teacher, Jefferson County Public Schools, Louisville, Kentucky

Ms. Betty Knight, Teacher, Alabama School for the Blind, Talladega, Alabama

Mrs. Camille Lancaster, Teacher, Preschool Service for the Visually Impaired, North Carolina Division Services for the Blind, Raleigh, North Carolina

Ms. Eileen Mauerman, Teacher, Utah School for the Blind, Ogden, Utah

Ms. Susie Moushegian, Teacher, Teacher, Dallas Service for Visually Impaired Children, Dallas, Texas

Ms. Mary Ann O'Connor, Teacher, St. Lucy's School, Philadelphia, Pennsylvania

Ms. Kathy Peterson, Teacher, New Mexico School for the Visually Handicapped Preschool, Albuquerque, New Mexico

Mrs. Debbie Ramsey, Teacher, Jefferson County Public Schools, Louisville, Kentucky

Ms. Maureen Ryder, Teacher, New York Association for the Blind (The Lighthouse); New York, New York

Mrs. Kathy Scott, Vision Supervisor, Capital Area Intermediate Unit, Harrisburg, Pennsylvania

Mrs. Charlie Sirman, Teacher, Visually Impaired Orthopedically Handicapped Classes, DeKalb County School System, Atlanta, Georgia

Ms. Rose Anna Stillwagon, Evaluator, Capital Area Intermediate Unit, Camp Hill, Pennsylvania

Ms. Ann Timfhenka, Teacher, Capital Area Intermediate Unit, Camp Hill, Pennsylvania

Mrs. Martha Waites, Teacher, Alabama School for the Blind, Talladega, Alabama

Summer Seminars

Early Childhood Education of the Visually Handicapped: Basic

Kay Alicyn Ferrell, Associate Professor, Teacher's College, Columbia University, New York, New York

Early Childhood Education of the Visually Handicapped: Advanced

Kay Alicyn Ferrell, Associate Professor, Teacher's College, Columbia University, New York, New York

Department of Educational and Technical Research Personnel

June Morris, MA, Executive Vice-President

Educational Research

Bolin, Gene	Administrative Assistant
Burton, Tobey, BA, OTR	Research Assistant
Caton, Hilda, EdD	Research Scientist
Duckworth, Bill, MS	Librarian/Research Scientist
Elder, Venus, MA	Research Assistant
Meredith, Rob	Programmer
Moore, Sheri, EdD	Research Scientist
Otto, Fred, BA	Research Assistant
Pester, Eleanor, MS	Research Associate
Poppe, Karen Peters, BA	Research Assistant
Poppe, Tom	Model and Pattern Maker
Skutchan, Larry, BA	Systems Programmer
Willis, Deborah, MA	Research Scientist
Wright, Suzette, BA	Research Associate

Technical Research Division

Donhoff, Darlene	Technical/Clerical Assistant
Hayden, Frank	Manufacturing Specialist
Phelps, Bob	Manager
Robinson, Jim	Manufacturing Specialist

Contracted Personnel

Bradley, Eddy Jo, MA
Hamp, Eric, PhD
Langley, M. Beth, MS
Petrosko, Joseph M., PhD
Stone, Gretchen, MEd
Stratton, Josephine, MS
Wheatley, Jeff

Publications

Elder, V. W., & Otto, F. L. (Eds.). (1991, Spring). Micro Materials Update.

Moore, S. B. (1990). References and resources on young blind and visually impaired children. AER Division 8 Newsletter.

Moore, S. B., & Chen, D. (1990). The parents and visually impaired infants project. The California Transcriber. 34(1), 16-18.

Otto, F. L. (Ed.). (1990, Fall). Micro Materials Update.

Skutchan, L. (1991, Spring). Telecommunications: Getting on line, File Transfers. Micro Materials Update, p. 3.

Skutchan, L. (1991, Fall). Telecommunications: Getting on line, Part II. Micro Materials Update, p. 7.

Skutchan, L. (1991, Fall). Telecommunications: Getting on line with MS-DOS. BAUD. 9(1), 1.

Wright, S. J., & Stratton, J. M. (1991). On the way to literacy: Early experiences for young visually impaired children. Re:view, 23, 55-63.

PROGRAM MATERIALS

Caton, H., Pester, E., & Bradley, E. J. (1990). Read again: A braille program for adventitiously blinded print readers--braille teacher's edition. Louisville, KY: American Printing House for the Blind.

Caton, H., Pester, E., & Bradley, E. J. (1990). Read again: A braille program for adventitiously blinded print readers--levels A-I. Louisville, KY: American Printing House for the Blind.

Caton, H., Pester, E., & Bradley, E. J. (1990). Read again: A braille program for adventitiously blinded print readers--print teacher's edition. Louisville, KY: American Printing House for the Blind.

Hamlett, C., Willis, D., Meredith, R., & Otto, F. (1990). Talking Typer Teacher's Manual. Louisville, KY: American Printing House for the Blind.

Presentations and Workshops

Caton, H. R., & Pester, E. J. (1990, July). Transition from lost vision to braille reading. Association for Education and Rehabilitation of the Blind and Visually Impaired International Conference, Washington, DC.

Meredith, R., & Otto, F. (1989, August). APH talking software. Inservice for Jefferson County Itinerant Teachers, Louisville, KY.

Moore, S. B. (1990, July). Choosing materials for very young visually impaired learners. Columbia University, New York, NY.

Moore, S. B. (1991, April). Educational materials for young and multihandicapped visually impaired children. Early Childhood Statewide Conference, Columbus, OH.
Tuscaloosa, AL.

Moore, S. B. (1991, April). Techniques and materials for parents and teachers of young blind and multihandicapped visually handicapped children. Ohio Resource Center for Low Incidence, Columbus, OH.

Moore, S. B., & Caton, H. (1991, June). Workshop on materials for the young and multihandicapped visually impaired student. Review Statewide Training, Bowling Green, KY.
Schools, San Diego, CA.

Moore, S. B, & Poppe, K. J. (1990, July). PAVII (Parents and visually impaired infants) materials. AER International Conference, Washington, DC.

Pester, E. J. (1990, September). Meet APH, new braille reading materials, and games for visually impaired. National Federation of the Blind Heartland Chapter, Kankakee, IL.

Pester, E. J. (1990, August). Research and braille instruction for adults. Mid-America Conference of Rehabilitation Teachers, Chicago, IL.

Pester, E., & Gissoni, F. (1991, March). Dating for young and old: Calendars for the visually handicapped. Kentucky CEC Conference, Ft. Mitchell, KY.

Pester, E. (1991, July). What's new in braille at APH? American Council of the Blind Convention, Braille Revival League Meeting, Tampa, FL.

Pester, E., & Gissoni, F. (1991, June). Dating for young and old: Calendars for the visually handicapped. North Central Regional AER Conference, Minneapolis, MN.

Skutchan, L. (1991, June). Tools and techniques for effective note-taking. Kentucky School for the Blind, Louisville, KY.

Skutchan, L., & Meredith, R. (1991, March). *Introduction to micorcomputers*. Kentucky School for the Blind, Louisville, KY.

Willis, D. H. (1991, March). *Improving typing skills of blind students using a computer with speech output*. KY-CEC, Ft Mitchell, KY.

Willis, D. H., & Mudd, G. (1990, July). *Computer materials for totally blind students*. AER International Conference, Washington, DC.

Willis, D. H., Ruconich, S., Skutchan, L., Meredith, R., & Robinson, J. (1991, March). *Computer products that enhance the lives of blind people*. Special presentation for advanced program students from Price Elementary School, American Printing House for the Blind, Louisville, KY.

Willis, D. H., & Skutchan, L. (1990, October). *Computer products and programs*. Annual Meeting, American Printing House for the Blind, Louisville, KY.

Willis, D., Skutchan, L., & Gissoni, R. (1991, April). *Talking computer products for blind students*. Special presentation for computer club from St. Albert the Great School, American Printing House for the Blind, Louisville, KY.

Wright, S. J., & Stratton, J. M. (1990, July). *On the way to literacy: Early experiences for young visually impaired children*. AER International Conference, Washington, DC.

New Products

APH Scientific Calculator: for Apple II Computers

Echo II with TEXTALKER

Echo II with Textalker--gs

Effective Use of Objects: A Process Centered Intervention

Grade 2 Braille Cards

Interpoint/Dymo Pocket Slate with Paper--kit

Read Again: A Braille Program for Adventitiously Blinded Print Readers

Talking Typer
  Teacher's Edition (5 1/4 inch disks or 3 1/2 inch disks)
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